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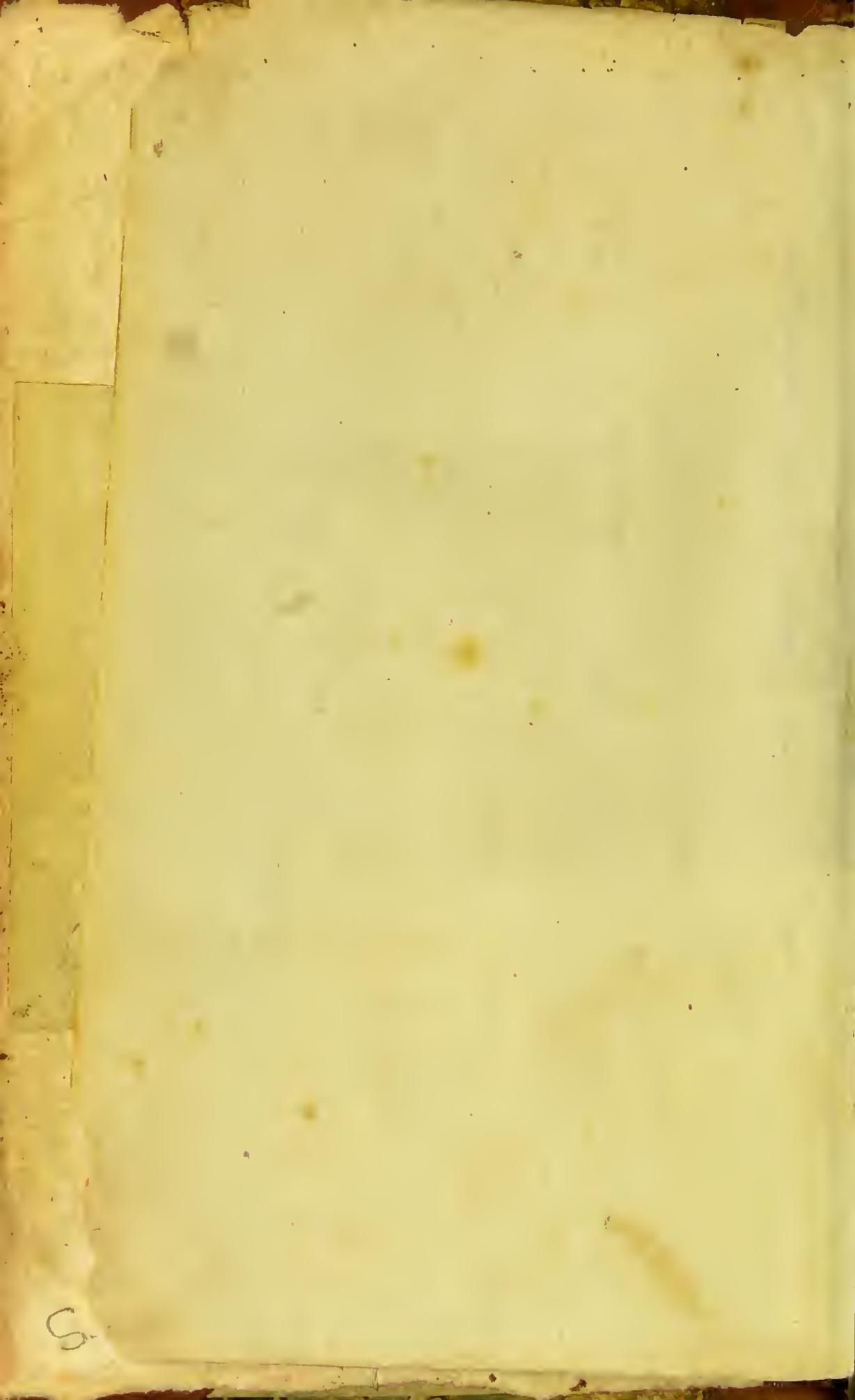
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S K E T C H

OF A PLAN TO EXTERMINATE THE
C A S U A L S M A L L - P O X
FROM GREAT BRITAIN;

AND TO

INTRODUCE GENERAL INOCULATION:

TO WHICH IS ADDED, A

C O R R E S P O N D E N C E

ON THE NATURE OF VARIOLOUS CONTAGION,

W I T H

Mr. DAWSON,	Professor WATERHOUSE,
Dr. AIKIN,	Mr. HENRY,
Professor IRVINE,	Dr. CLARK,
Dr. PERCIVAL,	Dr. ODIER,
Professor WALL,	Dr. JAMES CURRIE:

AND ON THE BEST MEANS OF
PREVENTING THE SMALL-POX, AND PROMOTING
INOCULATION, AT GENEVA;

WITH THE
MAGISTRATES OF THE REPUBLICK.



By JOHN HAYGARTH, M. B.

F. R. S. Lond. F. R. S. and R. M. S. Edinb. and of the American
Academy of Arts and Sciences.

IN TWO VOLUMES.

V O L. I.

— — —

L O N D O N,

Printed for J. JOHNSON, N^o. 72, St. Paul's Church-Yard.
M D C C X C I I I.

HABES jam, Lector, quæ de variolis mihi erant di-
cenda omnia; quæ, licet non nemo fortasse parvi penderit
pro seculi genio, scio tamen ego, haud parvo mihi labore,
curâ, atque industriâ, per multos annos continuos ea-
stetisse; neque jam a me fuisse evulganda, nisi vicisset
charitas in proximum, et studium aliis beneficiandi, vel
pretio existimationis propriæ, quam satis intelligo, a sub-
jecti novitate gravandam fore.

SyD. Opera. V. 4.

S

TO THE
K I N G.

SIRE,

HISTORY hath recorded many illustrious actions of your MAJESTY's ancestors, during a long succession of ages. Among them all, the most truly glorious, and, in its probable consequences, the most beneficial to mankind, was the introduction of inoculation into Europe, in the year 1721. The adoption of this most salutary art, by civilized nations, may

A 2 justly

DEDICATION.

justly be ascribed to the superior wisdom, courage and magnanimity of your royal progenitors.

But it is still to be lamented that so small a proportion of your MAJESTY's subjects, even yet enjoy the benefit of inoculation: it is still so far confined to the superior and least numerous classes of society, that the Small-pox continues to destroy fully as large a proportion of the inhabitants of England, as of any other nation. It continues to be the most fatal malady that ever afflicted mankind.

Your MAJESTY's paternal affection for your people, no less than
your

DEDICATION.

v

your anxiety to promote the national prosperity, will induce you to encourage any rational measures which can be proposed to remove or diminish so great a calamity. And, as your MAJESTY has graciously condescended to patronize the following proposal, it will, on that account, derive a superior claim to the attentive consideration of all men of knowledge, patriotism and humanity. To accomplish so important a design, the united efforts of several, especially the more intelligent orders of society, will be required. And as the execution of the plan must chiefly depend on the medical faculty, it may not be improper to remark,

A 3 that

DEDICATION.

that a transaction which promises, in so eminent a degree, to preserve human life, and which offers so honourable a competition of services, is peculiarly congenial to the spirit of the profession.

That your MAJESTY's reign may long continue to be prosperous and happy, is the fervent prayer of

Your MAJESTY's

most dutiful

and loyal Subject,

JOHN HAYGARTH.

THE
P R E F A C E.

THIS work is a sequel to the
INQUIRY how to prevent the Small-Pox,
published in 1784.

The reader is desired to observe, that, in the present, as well as the former publication, both the medical principles, and the practical rules thence deduced, are all founded upon facts. Against conclusions thus established, a theoretical, much less an hypothetical argument ought not to be employed; it cannot fairly have

any force. No objection can be valid, unless founded upon facts of equal number and authenticity.

Another caution which I wish to inculcate, respects the publick regulations, that, with great diffidence, I have ventured to propose. On so new and wide a field of speculation, where not a single mark had been traced to direct the judgment, in what manner to form the plan of an establishment, numerous errors and imperfections may be expected. But I must particularly entreat the reader not to pronounce a summary condemnation upon the SKETCH, nor to blacken its character by any of those harsh and discouraging expressions which all novelty upon important subjects is too apt to occasion, as, "a visionary scheme;" "an extravagant and dangerous innovation;" "an invasion of personal liberty;" "an expensive project;" &c.

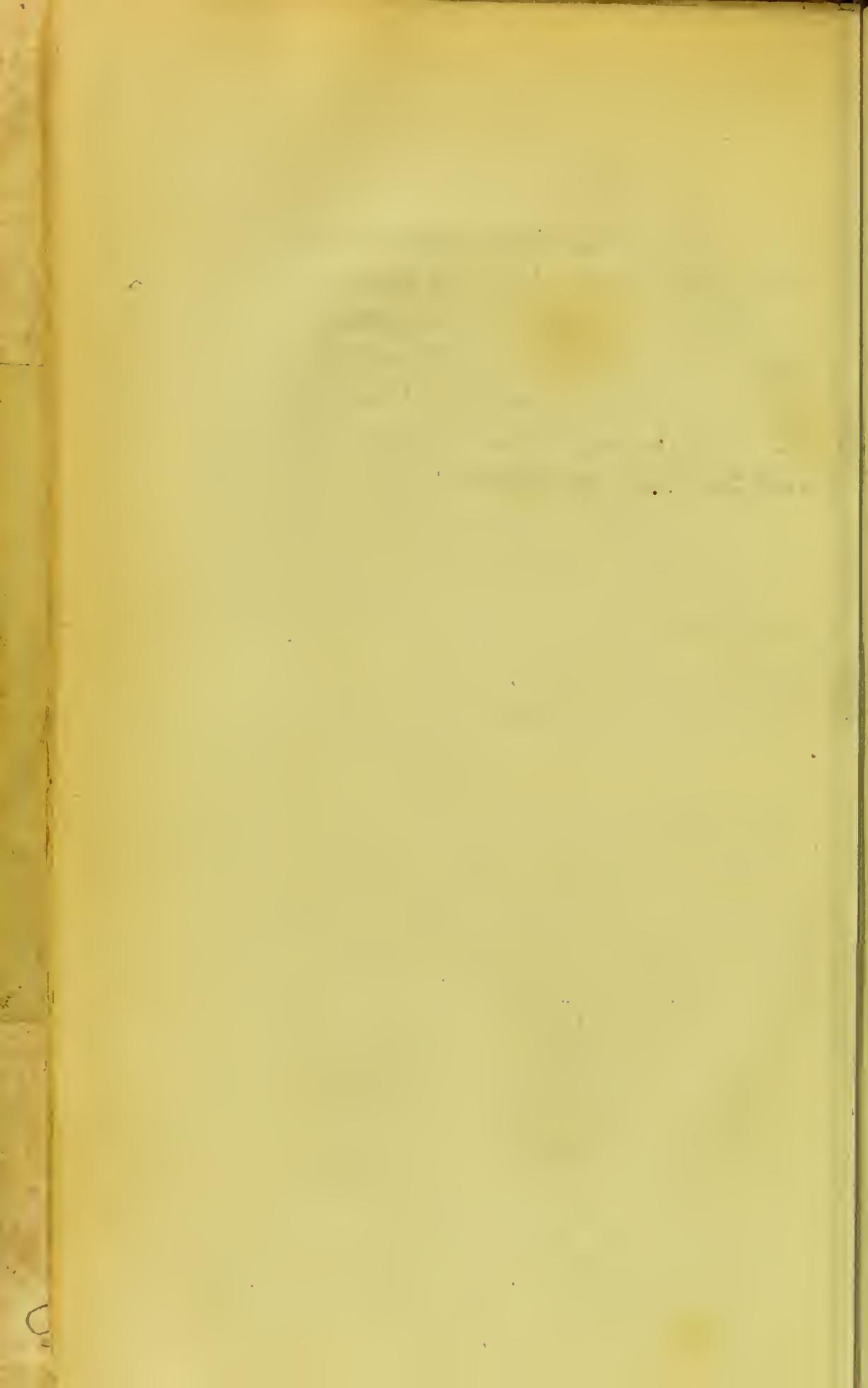
&c. As long as the medical principles remain unrefuted, it may be justly asserted, that the proposed *Outline* ought not to be wholly condemned, by any person who does not propose another.

But though I strenuously oppose a general sentence of condemnation, as being highly detrimental to the advancement of science, and to the relief of human misery; yet I would, with equal earnestness, solicit the reader freely and explicitly to state every particular doubt and objection, which the subject suggests. Such an examination of the proposed measures will have the most beneficial tendency, especially if accompanied, as indeed it ought always to be, with hints how the defects of the plan may best be supplied. The excellent periodical publications, which diffuse useful knowledge, and benevolent proposals

so universally throughout this island, may perhaps afford the best opportunity to discuss this subject with freedom and impartiality. If the principles be false, the illusion will soon vanish; but if they be founded upon truth, the strictest examination will strengthen and establish them. *Magna est vis veritatis et prævalebit.* One caution, however, may be properly suggested on this occasion, that, in such disquisitions, every personal remark, of praise or of censure, ought, as far as possible, to be avoided.

In general, I have studiously endeavoured to shun all political views of the question, and other extraneous digressions. But some apology is necessary for inserting a calculation how fast population would increase, if the small-pox were exterminated from Great Britain (p. 145.). Besides the neglect of the above rule, which, in this

this instance, has been inadvertently transgressed, many objections might be made to the accuracy of the conclusions. Population is manifestly influenced by many complicated causes, which the nature of this work did not lead the author to consider.



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INTRODUCTION.

INTRODUCTION.

THE regulations to prevent the *casual** small-pox at Chester, were so successful, even at the commencement of the society, established here for that purpose, as very early to suggest the idea of exterminating the distemper from Great Britain. In the year 1778, I proposed the *outline* of such a plan to the late Dr. John Fothergill, and had

Dr. Fother-
gill's opinion.

* The common expression of *natural* small-pox conveys a false idea; liberty is therefore taken to employ a more accurate term. What is called the natural small-pox is, in every respect, a *casualty*, as entirely so as a fractured limb, though unhappily the former happens more frequently than the latter.

INTRODUCTION.

the satisfaction of enjoying several personal conferences with him upon the subject. His character, as a physician, and philosopher of the most comprehensive knowledge, of the clearest and soundest understanding, is universally known. The goodness of his heart distinguished him no less eminently as the friend of mankind. The opinion of such a man will interest the curiosity of the medical and the philosophical reader, and will have due influence with the publick, especially with many respectable characters of good sense, and benevolent disposition, who have never so deliberately investigated the question, as to acquire the full confidence of their own judgment, in its determination. On returning to London in the autumn of 1778, he wrote me a letter, in which there is the following passage. "I have mentioned the intention of freeing this country from the small-pox to divers of the faculty, and shall continue to do so, as it falls in my way. " The

“ The proposal is received variously, “ but in exact proportion to their hu- “ manity.” In a subsequent letter, he says, “ I do not forget the business of “ the small-pox. I mention thy views “ and wishes as opportunity offers ; and “ shall very cheerfully unite in doing “ every thing in my power, to promote “ an institution, which has for its ob- “ ject the banishment of so great a “ plague.” The loss of so able, and zealous an advocate, in an undertaking at once so difficult, and so important, is greatly to be lamented. But though the cause has suffered a deplorable misfortune in being deprived of the assistance of such an active and respectable friend, yet, we may still reasonably hope, that, when properly examined and understood, it will obtain, from men of knowledge and humanity, that attention and encouragement which it shall be found to deserve.

The intelligent and benevolent reader will pardon the extreme solicitude, with

Question not
exclusively
medical.

INTRODUCTION.

which his attention is requested, on a subject which appears to be of the highest importance to mankind. The question, on which the propriety of the proposed regulations depends, is to be examined and determined, upon rational and philosophical principles. Its consideration by no means belongs, exclusively, to the medical profession. Gentlemen, whose education and talents have led them to the study of natural philosophy, are completely prepared to comprehend, and to decide upon the propriety of the proposed measures.

Effuvia.

A new theory, or even a solitary new fact in chemistry, astronomy, &c. attracts the general attention of philosophers through Europe, though its utility to mankind cannot be discerned. At a time when the study of nature deservedly engages the thoughts of men endowed with the most comprehensive knowledge and keenest penetration, the qualities of effuvia may, upon the same principle

principle of liberal curiosity, be regarded as worthy of notice. To determine in what circumstances they adhere to, or forsake solid substances; to inquire, at what degree, their impregnation begins and ceases to become noxious, may, in themselves, be thought curious and interesting topicks of investigation. The properties of vapour, or effluvia have long employed the ingenuity, and the experimental sagacity of philosophers, who, on this subject, have made the most entertaining and useful discoveries. Though many of those experiments are not applicable to the present subject, yet the habits of close thinking, and patient investigation, the faculty of discerning the conclusive force of abstract arguments, are indispensable requisites. A few simple principles of chemistry, and some medical ideas, with which literary men are generally acquainted, or may easily acquire, contain all the preliminary knowledge which is necessary for the

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full comprehension of this question. To the imagination, the inquiry can furnish no entertainment, but to the understanding, which clearly discerns the force of reasoning, the various bearings of argument, and the highly important conclusions which are fairly deducible from thence, it may afford a very high gratification. Readers of this description, it is true, are not very numerous, but they form a very important class of society; they guide the opinions, and ultimately regulate the conduct of nations. The wisest and best men happily possess a prevailing influence, which insensibly spreads, and diffuses the most beneficial consequences through the whole community.

The most ancient and respectable society of philosophers in Europe lately conferred their honorary medal on one of the first mathematicians of the age, for experiments on gun-powder. They were calculated to determine at what distance

distance the fatal effects of a given quantity might operate. The excellence of these experiments merits a reward which is worthy to be bestowed and received by the first of philosophers. The Royal Society, it must be allowed, have bestowed Copley's annual medal almost uniformly upon authors of real and important discoveries ; perhaps more remarkably so than any publick prize that any nation has offered for the competition of the ingenious. To ascertain at what distance the variolous poison exerts its poisonous quality is a question of incomparably greater consequence to mankind. Gun-powder is employed to destroy our enemies ; the small-pox is fatal to our friends and dearest connections.

Such researches would merit attention from every inquirer into the laws of nature. But when it shall be generally understood that effluvia are the efficient cause of the plague, small-pox, measles,

They propagate plague,
small-pox,
&c.

scarlet fever, and other pestilential dis-
tempers, and that, by a thorough and
accurate knowledge of their qualities,
we can learn how to elude the dreadful
mischief produced by the most fatal
enemies of the human kind, it will be
manifest that few philosophical investi-
gations can be proposed, which could
prove of equal importance to man.
During the last thousand years, the
small-pox alone has destroyed a full
tenth, and probably a larger proportion
of the whole human race !

Disquisition
useful

A full discussion of this subject
would produce great and important
advantages. A very eminent physician,
who expresses more doubt in regard to
the proposal explained in the SKETCH
than most of my other correspondents,
but with great candour and good sense,
describes his sentiments in the follow-
ing words. “ For several days, it ap-
“ peared a chimerical and impracticable
“ design; but the more I thought of it,
“ and

“ and the more I talked of it to others,
“ the less forcibly did these sentiments
“ present themselves ; until, at length,
“ meeting with people, who thought
“ still more injudiciously than I myself
“ had done at first, and others again
“ who urged matters that heretofore
“ appeared to me to militate against the
“ plan, which farther consideration
“ shewed me had no weight, I insen-
“ sibly began to argue on your side of
“ the question, and, in a short time,
“ became a warm advocate for your
“ opinions.”

The investigation of this subject has
given me some anxieties, accompanied
with long continued and patiently per-
severing inquiries. But the cordial
satisfaction which these speculations
have uniformly produced, far beyond
all comparison, overpaid the labour
and the thought which they have occa-
sioned. Professional duties allow but
little time for writing, but they afford
abundant

and delight-
ful.

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abundant leisure for thinking. The speculations, which gave birth to the following pages, have uniformly converted the tediousness of long and fatiguing journeys into the most pleasing entertainment: and have rendered solitary excursions incomparably more amusing than scenes of the gayest festivity. If the author could communicate to the reader any of the delightful meditations he has enjoyed in the investigation of these interesting principles, and, still more, in anticipating the prospect of the extensive benefits which they promise to mankind; such pleasing, and powerful motives would excite the most zealous exertions in this cause of humanity, and must insure success. Philosophy and philanthropy fully possess the heads and the hearts of our countrymen; and, in both respects, this subject, if fairly brought under their view, is peculiarly well adapted to excite such abilities and such dispositions.

Many

Many dark doubts overshadow this subject, and much preparatory disquisition will be required, in order to dispel the clouds of prejudice, and to admit the light of reason, sufficiently, to produce the general conviction, or even to engage the general attention of literary men. If many readers of clear heads and warm hearts could be induced to employ their thoughts on this inquiry, several of them might catch the enthusiasm of science and of benevolence. Not satisfied with mere speculations, some might apply the deductions of reason to the best purposes of humanity, and demonstrate to their neighbours, and to the public, with how little difficulty our fellow-creatures may be preserved from a painful and fatal distemper. To confer such benefits on the poor and helpless would afford the purest gratification, to every humane mind; but the consequences that would result from the general opinion, that we possessed a power

to

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to prevent, or suppress epidemical contagions, would be of incomparably higher importance. Plans of preservation would be adopted in different districts. Numerous facts of this kind, exhibited in various situations, would be adduced as practical proofs in confirmation of the truth. They would most effectually invalidate all hypothetical objections. They would ascertain, by incontrovertible proofs, how adequate the establishment proposed in the following pages might become, to exterminate the small-pox from Great Britain, if the regulations were faithfully executed. When it shall appear, that by a few easy precautions, the contagion may be prevented from spreading through certain towns and villages, while, in others, it produces the most dreadful devastation ; when well authenticated facts daily occur which uniformly confirm this conclusion ; and, when such transactions are fully stated and explained by unconnected and im-

partial

partial observers, a rational and firm foundation will be laid, on which the legislature may erect a publick establishment.

Persons respected for their understanding and humanity might introduce regulations to prevent the propagation of epidemical disorders in any situation. But the character and function of clergymen are peculiarly well adapted to promote associations for this benevolent purpose. By a philosophical education, they are rendered capable of becoming competent judges of the principles of these proceedings. By superior knowledge and respectability of character, they generally possess considerable influence over the opinions and conduct of the inferior as well as higher orders of people. By the authority of reason and revelation, they are best qualified to correct the baneful and absurd superstitions, which have contributed to diffuse and perpetuate the pestilence.

Particularly
to clergymen.

These

INTRODUCTION.

These expectations are not merely founded on the meritorious qualifications and dispositions of the clergy, with which this country and age are blessed. Their actual exertions in these duties of humanity have been attended with great honour to themselves, and with much benefit to their own parishes and vicinities.

The Honourable and Reverend Mr. Stuart, grandson of the celebrated Lady Mary Wortley Montague, who originally introduced inoculation into England, has recorded, in the Gentleman's Magazine, his successful services by promoting inoculation in his own parish of Luton in Bedfordshire.*

The

* This transaction appears so meritorious and so instructive that an abstract of Mr. Stuart's account is annexed. "Toward the end of last summer, a small-pox of the most malignant kind prevailed at Luton. Notwithstanding every care that prudence could suggest, as to cleanliness, medicine and attendance, scarcely more than half of our patients survived this dreadful disease; and, though

The Rev. George Hay Drummond, son of the late Archbishop of York, has printed a sensible, persuasive and pathetick exhortation on the benefits of inoculation, addressed to the inhabitants of Doncaster, where he is vicar.

A very

though they were kept at some distance from the town, it was found impossible to prevent the infection from spreading. Alarmed at the danger, I endeavoured to overcome the prejudice and the fears of the people, and to prevail on them to be inoculated. The infection was accordingly communicated to twelve hundred and fifteen, of whom only five died; and, soon after, to seven hundred more, with equal success.

“ I mean to recommend annual inoculations at the parish charge. This may be supported on principles of œconomy, as well as on principles of humanity. The health and safety of the people ought ever to be the supreme object of parochial management. The life of an industrious parent is absolutely invaluable; and he, who thinks it can be rated too high, is no less ignorant of policy, than destitute of feeling.

“ For the nine years, I have held the living of Luton, the average number of small-pox patients is twenty-five. These, at the lowest computation, stand the parish at two guineas each, exclusive of medical assistance. Should my plan of annual inoculations take place, the expense would

not

INTRODUCTION.

A very judicious discourse was preached and published by the Rev. W. Turner of New Castle upon Tyne, to promote the periodical inoculations

not amount to the fifty guineas, which are now paid for those who have the small-pox naturally. But, alas! these fifty guineas are but a small part of the real charge and inconvenience produced by this dreadful malady. Its almost constant effect is a permanent augmentation of the parish expenditure. If a labourer dies, his family must be supported. If a mother is lost, the children must be removed to a work-house, as their father cannot spare time for employments that are merely domestick. In a work-house, they lose innocence, reputation, and that sense of independence, which is the surest principle of industry.

“ I have troubled you with these observations, because I am confident they are applicable to more parishes than mine; and because I am equally confident, that, were inoculation generally practised, it would lessen human misery, save many a useful life, and even promote that œconomy which many think the only object worthy of attention.”

If seven out of nineteen hundred and fifteen died of inoculation; and if we reckon the deaths by the casual small-pox at one in five (though the malignity of the epidemick warrants a much higher estimate), it follows, that *three hundred and seventy-six* lives were saved by the rector of the parish; who appears to be not more distinguished by his rank, than by his knowledge and beneficence. See the Gentleman’s Magazine for April, 1788.

gratuitously

gratuitously bestowed on the poor children of that large and populous town. During the establishment of the small-pox society in Chester, several of the clergy preached excellent sermons on the occasion, and all of them employed their best endeavours to prevail on their poor and ignorant parishioners to avoid the casual infection, and to accept of inoculation.

But the clergyman whose judicious and spirited exertions have contributed the most essential service to establish, and to propagate the doctrine, on which the proposed measures are founded, is the Rev. Mr. Stephen Moore, vicar of Brodsworth, near Doncaster, in Yorkshire. He has proved, by several authentick facts, with what ease and certainty, the minister of a country parish, can prevent the introduction, or suppress the communication of the casual small-pox, in his neighbourhood. If it could be generally understood how

C easily

INTRODUCTION.

easily so important a benefit might be conferred, other benevolent men among the clergy and laity would follow his meritorious example. An account of these proceedings is so much to my purpose, both in confirming the doctrine, and in promoting the general adoption of measures to prevent the propagation of epidemical distempers, that I have asked and obtained permission to reprint this excellent essay, which was written, and published in the London Medical Journal, by Mr. Lucas, a very ingenious surgeon of Leeds in Yorkshire.*

It may not be improper to mention another proof of the humane disposition of the clergy in adopting measures for the preservation of the lower class of people from epidemical distempers. A Reverend Baronet, Sir William Clerke, rector of Bury in Lancashire, has lately published "Thoughts upon the Means

* See the Appendix.

of preserving the Health of the Poor, by the Prevention and Suppression of epidemic Fevers; addressed to the Inhabitants of Manchester, and of the several populous trading Towns surrounding and connected with it." These "Thoughts" manifest great goodness of heart, and will probably prove of much benefit by associating the worthy and charitable in the cause of the distressed poor. And when the efficacy of these associations in suppressing epidemical fevers shall become generally known, their influence may be extended to the still more important purpose of preventing the fatal, but unaccountably neglected ravages of the small-pox.

The nation is feelingly alive to the sentiments of humanity. The labours and exertions of one man have excited the publick compassion in behalf of the most worthless portion of the community, the prisoners in our jails. The

National hu-
manity to
prisoners;

C 2 legislature

INTRODUCTION.

legislature having given permission and authority to justices of peace to assess themselves, and their counties, towns, &c. to defray the charge of erecting prisons, the privilege has been accepted through the kingdom with wonderful alacrity. These spontaneous and voluntary contributions of pure philanthropy, have been levied without a murmur, at a period when the publick burdens were heavy beyond all example of this or any other country, and new taxes were annually imposed to supply the deficiencies required to pay the interest of the national debt, and the national expenditure. Amid such difficulties, a neighbouring county is said to have bestowed so large a sum as *eighty thousand* pounds within a few years, in the construction of prisons. These receptacles of the out-casts of society are becoming more magnificent and more expensive than our palaces; not through any motive of vain ostentation, but from the genuine spirit of humanity.

The

The African negro, hitherto degraded below the rank of the human race, from the abhorrence, and contemptuous treatment with which he was regarded, has lately engaged the national sympathy. It cannot be doubted that these humble creatures, if an opportunity offered, would experience the British generosity, as well as pity. The spirit, which thus gloriously inspires the people, is not ostentatious compassion at the expense of others ; not mere pathetick speeches which cost nothing, and which would evaporate in cheap exclamations. Of the promptitude with which the national spirit would embrace every possible opportunity to exert its beneficence towards these wretched objects, an apposite instance may be produced from the mode of passing a late act of parliament, to provide a more humane method of transporting slaves from Africa to the West Indies. When this bill was before the house of Peers, Lord Hawkes-

and to African slaves ;

bury proposed to offer a reward of *thirty pounds* for the preservation of every additional life. It was computed that the annual expence of these rewards might amount to *seventeen thousand pounds*, if, by their influence, five hundred and sixty-seven lives could be saved. The sum of money was considerable, and proposed in an irregular manner, to that body of the legislature which confessedly has no right to impose taxes. Yet no latent principle of avarice, or, what is a much more powerful motive in an Englishman's breast, no constitutional jealousy, produced a single dissenting voice, in either house of parliament.

solicited for
victims of the
small-pox.

If our criminals, who undoubtedly are the most guilty class of the whole community, and the negro slaves, a race of people of so degraded a character, and situated in so distant a region, have obtained a liberal portion of the pity, and of the bounty of

of Britain, we cannot entertain a doubt, for a single moment, that the like generous and compassionate sentiments would operate, and much more powerfully, to succour and protect our own innocent infants, the darlings of our bosoms. The nation that voluntarily offers a large bounty to save the life of a negro slave, would cheerfully and readily bestow one *twentieth* or one *thirtieth* part of such a premium to preserve a British child to his family and to his country. If such grievances and calamities were properly understood, they would soon obtain adequate redress. A people who are shocked at the bare narrative of misery, suffered by the African slaves, on board crowded transports, or of criminals in our jails, could not behold with indifference, the poor helpless children of a neighbouring cottage; who, through the ignorance, the superstition, or the penury of the parents, are daily dying of the most painful, and loathsome dis-

temper with which this land is visited. Many would gladly bestow their bounty in these deeds of mercy, if any plan, which should be thought practicable, were proposed. If the sufferers by the small-pox could obtain the same degree of attention as the criminal and the negro, at present fortunately enjoy, they would not long be destitute of an equal share of compassion, and would soon obtain effectual relief. Their situation is falsely supposed to be hopeless; on that consideration, and that alone, their cause is abandoned. All exertions to protect them are thought ridiculous, because they have been hitherto deemed impossible. If it were generally known that we had the power, we should not long want the inclination to help these wretched sufferers. Our sentiments of commiseration, and acts of beneficence would not solely be moved by the description of others; we may behold miserable objects, in sufficient numbers, with our own eyes. These emotions need not

not solely be excited by the inhabitants of the remote regions of the earth, but by our neighbours and fellow-citizens ; not by the most guilty, but the most innocent ; not by objects of disgust, but of beauty, tenderness, and love.

In arranging the proposed *outline* of a publick establishment, difficulties, and doubts must necessarily arise, in chusing the most eligible plan. On some points, my opinion has varied, and particularly in determining what measures ought to be pursued in regard to inoculation. At first, it seemed sufficient to permit the practice of this salutary art, under certain easy regulations, that would prevent the propagation of infection. Afterwards, it appeared wisest and best to propose its encouragement or injunction, in certain circumstances ; namely, that the opulent, when they inoculated their own children, should be required to offer the benefit of this blessing to their more indigent

Inoculation
permitted or
injoined ?

indigent neighbours. Both sides of the question might be supported by various arguments; and, undoubtedly, men of good understandings might deduce from them different conclusions. In one instance, it has happened remarkably so. Two eminent physicians, who have honoured the INQUIRY *how to prevent the Small-Pox*, by translating it into foreign languages, have drawn inferences diametrically opposite to each other, from the facts and arguments contained in the original Treatise.

Inference of
Dr. De la
Roche;

The French translator,* Dr. De la Roche, a very ingenious writer, in a

* RECHERCHES sur les moyens de prévenir la petite vérole naturelle. Et procédés d'une Société établie à Chester pour cet objet; et pour rendre l'inoculation générale. Traduits de l'Anglois de M. HAYGARTH D. M. Par M. DE LA ROCHE, Médecin de Monseigneur le Duc d'Orléans, et du Régiment des Gardes-Suisses, Membre du Collège des Médecins de Geneve, et de la Société Royale de Médecine d'Edinbourg. A PARIS. Chez Buisson, Libraire, rue des Poitevins, Hôtel de Megrigny. 1786.

copious

copious preface to the translation, adopts and supports the doctrine advanced in the INQUIRY, by original observations of his own. He proposes only two objections: one of these is occasioned by an imperfect hint, at the conclusion, where, what had been long before and ever since my favourite wish, the extermination of the small-pox from Great Britain, is briefly and indeed inaccurately expressed. He disapproves of this idea, but states his arguments with candour, and judgment. However, when the establishment, now proposed, is more fully explained, and it appears probable, in what manner it will operate, by preventing the casual small-pox, and by increasing the numbers to be inoculated, I entertain hopes that it will merit the approbation of his superior understanding.

On the contrary, it is a curious fact, Of Dr. Cap-
that the German translator, Dr. Cap- pel.
pel

pel of Berlin,* published the book to discourage inoculation. This circumstance, at the first view, struck me with astonishment. I was utterly at a loss to conceive, how my arguments, which were written to promote, could be translated on purpose to discourage this salutary art. The inference however seems not to be unfair, or inapplicable; as the book exhibits incontestible proofs, how easily and successfully the casual small-pox may be avoided.

We cannot entertain a doubt, that, in Britain, inoculation ought to be encouraged as much as possible, considering the present state of society, and the opinion which very generally prevails in this country. But plausible arguments might be suggested to render it

* Dr. JOHN HAYGARTH's Untersuchung wie den Blattern zuvorzukommen sey. Aus dem Englischen übersetzt von Dr. Joh. Fr. Ludw. CAPPEL. BERLIN und STETTIN, bey Friedrich Nicolai. 1786.

probable

probable, that, in some other nation equally intelligent, patriotick and vigorous in the execution of beneficent measures, especially if exposed to a less intimate intercourse with foreigners, a people to whom inoculation is unknown, might with least difficulty exterminate the small-pox. The common alarm of all, would most powerfully excite the united efforts of the whole community, particularly that portion of it who are distinguished for their knowledge, opulence and benevolence.

The most serious and solid objection that has been advanced against inoculation, is deduced from a comparison of the bills of mortality, for a series of years, in various places. They shew that a larger proportion of inhabitants has died of the small-pox, in towns where it is practised, than in the same before it was known, or in others where it is prohibited. Thus in London,

Partial inoculation injurious.

INTRODUCTION.

don, Geneva,* and other towns in different situations and circumstances, the mortality of this distemper has increased since the introduction of inoculation. In this part of England and Wales, I am fully persuaded from long and attentive observation, that the proportional deaths by the small-pox have not been diminished, but augmented by the partial adoption of this practice. But general assertions, unsupported by facts, have little weight with the intelligent reader. For this reason, it will be requisite to produce some authentick observations to illustrate the position; though they may not be so numerous, so various, or for such long periods, as to establish the conclusion by positive and decisive proofs.

Mortality of
small-pox in
France.

The celebrated M. de la Condamine computes that in France *one in ten* of all

* Dr. De la Roche's preface to the French translation of the INQUIRY.

who

who are born, dies of the small-pox. Dr. Rosenstein, who wrote an excellent treatise on the diseases of children*, shews that every *tenth* boy, and every *ninth* girl, dies of it in Sweden, according to the accurate report of the commissioners appointed to make the inquiry.

In London † the births are to the deaths by the small-pox, as, *six and a fourth to one*; in Manchester, † as *six and a half to one*; in Liverpool, † as *five and a half to one*; in Chester, as *six and two thirds to one*.

In London,
Lancashire,
Cheshire;

It is true, that this distemper attacks children at an earlier age, and consequently is fatal to a larger proportion of people, in great than in small towns and villages. But in this neighbourhood, neither in town nor country, no

* Chap. XIII.

† See Baron Dimsdale, Drs. Percival, Dobson, &c.

considerable

considerable number, who are capable of receiving the distemper, escape it till they are men and women. To establish the truth of this remark, in 1781, I learned from Mr. Edwards, surgeon of the Cheshire militia, that all the regiment had been infected except *thirty* in *six hundred*, or *one in twenty*, the proportion naturally exempted from it through life. When the Lancashire militia were in Chester, I made the same inquiry of Mr. Drinkwater, their surgeon. He informed me, that nearly the same proportion of them had passed through the small-pox. At another time, (1782) I wished to ascertain what proportion of the Cheshire militia had been inoculated, and learned that out of *four hundred* and *sixty-six* who had passed through the disease, only *six* had received it by inoculation.

In Kent;

Contrast the observations here accurately stated, in a district where inoculation is encouraged, with others, in a different

different part of the kingdom, where it is cautiously avoided. The Rev. Mr. Howlett, author of Observations on the Population of England, the candid and intelligent opposer of the celebrated and ingenious Dr. Price, in a letter dated 1782, wrote me the following remark. ' I have been twenty years curate of two country parishes, not six miles distant from this town, (Maidstone in Kent); the first twelve years, of Boughton, and the last eight, of Hunton. Boughton, about a year ago, contained, as appears from an accurate enumeration, four hundred and ninety-seven inhabitants, and Hunton four hundred and thirty-two. During the twelve years in the former, and eight in the latter, the number of deaths by the small-pox, in both, had not exceeded five. I believe that I might affirm, that there have not been above five deaths in my native parish, within the last twenty years, although it now contains six hundred and

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‘ twenty-four people.’ Hence it appears, that among one thousand and eighty-eight inhabitants, taken in three country parishes of Kent, only ten persons have died of the small-pox in twenty years, or that its annual fatality has not exceeded *one in twenty thousand.*

In Sussex. Mr. Connah, secretary of the infirmary, and formerly inspector of the small-pox society, at Chester, informs me, that both the casual and inoculated distemper are carefully avoided in Sussex. He was a practical surgeon at Seaford in that county, and, at my request, made inquiry what proportion of the inhabitants had died of this pestilence. The town contains about seven hundred people. He was informed, that, about eleven years ago, one person had died of the small-pox, but could not learn when a like misfortune had happened in the place, antecedent to that period. How far this wonderful exemption from the mortality of the distemper extends through

through the south of England, I cannot determine. The facts here related in regard to both Kent and Sussex are taken by accident, and I have no reason to believe them extraordinary in these counties. But no fact, in any degree similar to them, can be produced in this neighbourhood, nor probably in any other, where inoculation is freely allowed, and where, at the same time, the casual contagion is permitted to make its destructive progress without any kind of interruption. If the feeble, irregular, unconnected, and unauthorized efforts of individuals can prevent so much mischief, how much more benefit might reasonably be expected from the united, systematick and concerted regulations of the whole island, aided and strengthened by legal premiums and punishments !

In other parts of the kingdom, inoculation may have been practised by so large a proportion of the people, as to have saved many lives: an event so pleaf-

D 2 ing

ing to every humane mind may probably have taken place in some part of Hertfordshire, through the eminent success, and beneficent disposition of Baron Dimsdale.* But, as far as my circle of observation extends, both in England and Wales, this improved method of communicating the distemper has manifestly appeared to be injurious to the poor, though eminently useful to the rich. It has become prejudicial to the community, though human art never bestowed so valuable a blessing as it confers on the few intelligent individuals who adopt it. This consideration ought to have great weight: and, in one of the most enlightened nations of Europe, it occasioned a prohibition of inoculation in large towns, twenty-five years ago, which has never been repealed.

This conclusion, respecting the pernicious consequences of so salutary a discovery, appears to be highly paradoxical, but admits of a satisfactory

* See his Tracts, p. 156.

explanation.

explanation. It has been falsely attributed, by inattentive observers, to inoculated patients spreading the casual infection; an event, which, in a few instances, might inadvertently happen. But the chief mischief which arises from the partial practice of this art, in any country, may be fairly attributed to another cause. It removes from society all opposers of the progress of the small-pox. Before inoculation was known, a gentleman's family, liable to the distemper, was held in continual terroir of its visitation; watched its approach into the neighbourhood with careful solicitude; took early, and often successful measures to prevent its introduction into the village or town which was situated in or near the place of their residence. These exertions, by checking the progress of the pestilence, in numerous districts, would frequently prevent its communication into larger towns, and thus diminish its fatality among the inhabitants. But, at

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this time, and in this neighbourhood, all who dread the distemper are inoculated ; whence the community are wholly deprived of the benefit of these salutary precautions. The poison is widely and destructively dispersed, as chance, ignorance and folly may direct. The intelligent and opulent, whose families enjoy the inestimable blessings of inoculation, ought certainly, in generosity, and even in justice, to promote measures to preserve the weak, and defenceless multitude from the calamities to which *they* alone are exposed.

S K E T C H

OF A

PLAN TO EXTERMINATE THE

SMALL-POX.

PART I.

La petite vérole est la plus générale de toutes les maladies, puisque de cent personnes il n'y en a que quatre ou cinq qui en soient exemptes. C'est en même temps une des plus meurtrieres, et si elle est souvent tres-douce, elle est d'autres fois presque aussi ravageante que la peste. TISSOT.

PRELIMINARY CONSIDERATIONS.

§ I.

BEFORE a plan to exterminate the casual small-pox be submitted to the publick consideration, it will be useful and instructive to examine the circumstances of its introduction, and

Small-pox introduced in an ignorant age;

the causes of its continuance among us. This distemper has been regarded, for many centuries as the inevitable enemy of the human race, so as to suppress every attempt, hope, or even wish to avoid it. The various causes of this fatal delusion require a minute investigation.

It is generally allowed, that, in the first ages of the world, for several thousand years, mankind were not afflicted by the small-pox. This pestilence commenced at such a period of universal ignorance that no contemporary writer has given us any description of it, though, on its first introduction, when none had passed through the distemper, it must have produced a general desolation, and destroyed a very large proportion of the human race. Rhazes, a celebrated Arabian author and physician of Bagdad, the capital of the Saracen empire in Asia, is the earliest writer extant, and, as he intimates, is the first who composed a regular

regular treatise on the small-pox ; though he lived near three hundred years after the commencement of this terrible plague. As far as can be ascertained, it first appeared about the beginning of the seventh century. And in 640, the army of Omar, Caliph of the Arabians, and second successor of Mahomet, under the command of the savage Amrou besieged and took Alexandria, at that period one of the largest cities in the world. By an immense concourse of people, comprehending the besiegers, and the besieged, the small-pox was widely dispersed among mankind. It highly deserves notice that the era of ignorance commenced about this period. For, on the same celebrated occasion, the Alexandrian Library, which comprehended, in several hundred thousand volumes, all the learning and knowledge of the ancients, was burned by the express command of this barbarous conqueror. On contemplating this extraordinary concurrence of events, we

are

are struck with reverence and awe at the inscrutable dispensations of Providence, in permitting the darkest ignorance, and the most fatal pestilence to overwhelm the earth, at the same period.*

The introduction of this distemper is an event of the most interesting importance in the history of mankind, and yet it has never been recorded by any contemporary historian who writes the transactions of this period. For Mr. Gibbon, whose researches are so eminently distinguished for their diligence, erudition and sagacity, is totally silent on this subject, though his silence is manifestly a most important defect in his justly celebrated history of the decline and fall of the Roman empire. The

* 'After a century of ignorance, the first annals of the Musulmans were collected, in a great measure, from the voice of tradition.' Gibbon, tom. V. p. 282. And again, p. 511. 'the seventh and eighth centuries were a period of discord and darkness.'

• ravages

ravages of the small-pox commenced with, and every where accompanied the marvellously rapid, and, otherwise, the unaccountable progress of the Arabian conquests.

The army and most of their attendants, except their children, having previously had the small-pox, would introduce it into every fresh province they invaded, where it would attack nineteen in every *twenty* of the inhabitants, and probably prove fatal to a *fourth* part of the whole people: * when the contagion is first introduced among barbarians, its mortality usually rises to this high proportion. Let us picture to ourselves the wretched distress that must inevitably result from such complicated calamities. In circumstances so embarrassing, few nations could resist a foreign invasion. It hence appears, that a principal cause of this revolution of nations, is buried in the darkest oblivion.

* Crantz's History of Greenland, book V. § 8.

The words of the learned Dr. Freind will fully explain the progress of this terrible visitation. ‘ By the earliest account we have of the small-pox, we find that it at first appeared in Egypt, in the time of Omar successor to Mahomet: though no doubt since the Greeks knew nothing of it, the Arabians brought it out of their own country, and might derive it originally from some of the more distant regions of the east. For the oldest of their writers do not speak of it as a distemper, which had taken its rise very lately. And as this people, in less than *thirty* years did propagate its religion and empire, so did it no less this modern evil, not only through Egypt, but Syria, Palestine and Persia, and a little while after, along the Asiatick coast through Lycia, and Cilicia: and, in the very beginning of the next century, farther into the maritime parts of Africk, and cross the Mediterranean even into Spain itself.’*

* Freind’s History of Physick, vol. II. p. 189.

Let us recollect the state of mankind on this occasion. The Saxons were making their cruel and destructive ravages in Britain. History has not ascertained the period when it spread to this distant region: it was probably about the commencement of the Saxon Heptarchy. At this era, the Goths, Vandals and Franks had overwhelmed all the other civilized nations of Europe with savage devastation. So utterly destitute of knowledge was the age, that no effort appears to have been made to check this terrible calamity. They even seem to have been more ignorant of the first duty of nature, self-preservation, than the savage Calmucks, and Hottentots of modern times. For on the respectable authority of Baron Dimsdale, we are informed that the former,* and of Dr. Mead, that the latter,† by their judi-

* See his Tracts on Inoculation, p. 152.

† Mead de Variolis. cap. I.

cious regulations, prevented the introduction of the distemper among their people. No record remains to shew that the inhabitants of Britain, or of any other nation in Europe made similar attempts to resist the invasion of this calamitous pestilence. Seven centuries of the darkest ignorance succeeded: and, when the light of science began to dawn, this dreadful enemy of mankind, to which all had submitted, for so long a period, without any attempt of resistance or escape, was discovered. It has consequently been deemed unconquerable and inevitable.

§ II.

Continued by
Sydenham's
hypothesis.

The first introduction and long continuance of this pestilence may be fairly attributed to an ignorant and barbarous age. But the next cause of perpetuating the calamity may probably be ascribed to the hypothesis of a physician

cian distinguished, in the highest degree, for his knowledge and sagacity. Impressed with the profoundest reverence and gratitude for the transcendent merit of the great Sydenham, I venture, with peculiar reluctance, to dispute his opinions. By a wonderful accuracy in describing diseases, and happy sagacity in discovering remedies, he has certainly contributed more than any, and probably more than every other author to the advancement of physick, and the relief of human misery. Even the opinion which I regard as erroneous, and pernicious, has such strong marks of verisimilitude as to have obtained, in some degree, the universal assent of physicians, for above a century, not only in this, but in every other country illuminated by the light of science.

Sydenham's notions of the propagation of contagious distempers, exemplified in the plague, the small-pox, and the measles, being perfectly analogous,

to

to each other, but equally false and dangerous, it will be useful to exhibit them in one connected view.

He supposes that ‘ there are various constitutions of different years, which originate neither from heat nor cold, moisture nor dryness, but which depend on some occult, and inexplicable alteration in the bowels of the earth; whence the atmosphere is contaminated with such effluvia, as render the human body liable to peculiar diseases; during the influence of this constitution, which ceases in the course of a few years, and gives place to another.’ ‘ *Variæ sunt nempe annorum constitutiones, quæ neque calor, neque frigori, non siccо humidove, ortum suum debent, sed ab occulta potius, & inexplicabili quadam, alteratione in ipsis terræ visceribus pendent, unde aér ejusmodi effluviis contaminatur, quæ humana corpora huic aut illi morbo addicunt, determinantque; stante scilicet præfatae*

‘ *præfatæ constitutionis prædominio, quæ,*
‘ *exacto demum aliquot annorum curriculo,*
‘ *faceſſit atque alteri locum cedit.*’*

In consequence of this preconceived hypothesis, he proceeds, in the language of full conviction: ‘ That there exists a certain occult crisis or texture of the atmosphere, which, at different times, excites different distempers, none can doubt, who will only observe, that one distemper, at a certain season, shall attack an infinite multitude of people, and become epidemical; yet, at another time, shall seize only one or two, and proceed no farther. The small-pox, and especially the plague, afford the clearest and most undoubted examples of this observation.

‘ But of this disposition of the atmosphere, whence the morbifick

* Syd. Opera, sect. i. cap. ii. p. 41.

‘ quality proceeds, we are entirely ignorant, as well as of many other points, concerning which foolish and proud philosophers vainly trifle. Whatever may be their nature, we have reason to venerate the clemency and the kindness of the great and good God, because he has ordained that the *pestilential* constitutions of the air, or those which produce the plague, the most dreadful of all calamities, and the most fatal to the human race, should return seldom more than others which excite less mortal distempers. Whence it happens that the plague rarely rages with destructive violence in Britain at a shorter period than thirty or forty years.’

‘ *Aëris massæ occultam ejusmodi sive crasin, sive texturam, obtingere, quæ diversarum diversis temporibus ægritudinum ansa atque pararia existat, nemini obscurum est, qui modo animadverterit, unum*

‘ unum eumdemque morbum, certa aliqua
‘ tempestate, infinitam mortalium vim cor-
‘ ripere, ac Epidemicum fieri; alias tamen
‘ unum, alterumve, hominem afflixisse con-
‘ tentum, ulterius non grassari. De Va-
‘ riolis, ac in primis de Peste, hujuscē
‘ capitīs argumento, res est sat, superque,
‘ manifesta.

‘ At vero quæ, qualisque, sit illa aëris
‘ dispositio, à qua morbificus hic apparatus
‘ promanat, nos pariter ac complura alia,
‘ circa quæ vecors, ac arrogans, Philo-
‘ phantum turba nugatur, plane igno-
‘ ramus. Quicquid sit, hoc saltem nomine
‘ Dei Opt. Max. clementiam ac boni-
‘ tatem, meritissimo jure, veneramur, quod
‘ aëris Constitutiones Δοκιώδεις, id est, Pestem
‘ malorum omnium immanissimum, ac hu-
‘ mano generi maxime internecinum, infe-
‘ rentes, rarius evenire voluerit, quam
‘ quæ cæteris affectibus, minus exitialibus,
‘ suscitandis inserviant. Unde fit, quod
‘ hunc orbem nostrum Britannicum Pestis,
‘ vix frequentius quam post annorum cir-

*'citer triginta, vel quadraginta, inter-
'valla, summo scilicet perniciei vigore, ac
'tota furiarum acie, adoriatur.'**

Though Sydenham thinks contagion necessary to produce the plague, yet he entirely attributes the generation, and the diffusion of the measles and of the small-pox to the peculiar constitutions of the atmosphere. He never seems to have suspected that the measles were infectious, and but once transiently and slightly mentions that quality as the cause of the small-pox.† His idea of the propagation of the plague is thus explicitly expressed, and deserves peculiar attention; since, if the name of one distemper be substituted for the other, it comprehends a very clear, full and exact description of the doctrine which physicians have

* Sydenhami Opera, sect. ii. cap. ii. p. 107. See much more to the same purpose, Syd. Op. p. 235. *Videntur, &c. jam memorato.*

† p. 132.

very

very generally adopted, for the last century, concerning the propagation of the small-pox. ' But besides a ' peculiar constitution of the air, or ' common cause (of the plague) there ' requires an occasional cause, namely, ' miasms or seeds from some pestilential body, either by immediate intercourse, or by the communication of ' some *fomes* which conveys the poison. When this happens, in such a ' constitution of the air as we have ' described, a little spark soon produces ' the most horrible conflagration; and ' funerals, every where increasing, the ' universal atmosphere, for this whole ' tract of country, is rendered pestiferous and contagious, both by the ' breath of patients, and the exhalation from bodies dead of the ' plague; so that now, neither personal intercourse with the patients, ' nor with the poison is required, for ' the propagation of this dreadful dis- ' temper; but any person, however

‘ carefully secluded from patients ill of
 ‘ the plague, merely by breathing the
 ‘ common atmosphere, is infected by
 ‘ its pestiferous quality, if the hu-
 ‘ mours of his body be capable of
 ‘ receiving the contagion.’

‘ *Verum præter istam aëris Constituti-*
 ‘ *onem, ceu cauſſam communiorem, accedat*
 ‘ *oportet & alia procatarctica, nimirum*
 ‘ *μιάσματ&* five seminii, à pestifero aliquo
 ‘ *corpore, vel immediate ac propiore con-*
 ‘ *sortio, vel mediate ac per fomitem aliunde.*
 ‘ *transmissi, susceptio. Hoc enim si, in-*
 ‘ *stante qualem diximus aëris diathesi, fieri*
 ‘ *contingat, ab exigua primum scintilla*
 ‘ *mox horribile erumpit incendium, ac den-*
 ‘ *satis undique funeribus, universo aëri per*
 ‘ *istum terræ tractum à Peste, tum labo-*
 ‘ *rantium halitibus, tum mortuorum cada-*
 ‘ *veribus, labes & contagium inducitur;*
 ‘ *adeo ut, ad tristissimæ ægritudinis pro-*
 ‘ *pagationem, jam non amplius vel fomite,*
 ‘ *vel personali consortio opus sit; verum*
 ‘ *quemcumque hominem, vel summa cura*
 ‘ *à Peste*

‘ à Peste correptis semotum, ipse aër cum
spiritu intro subiens, per se ac suo
Marte inficere valeat, modo ille corpus
habeat humoribus, ad afflatum excipi-
endum paratis, refertum.’*

The plague excites so universal an attention and alarm among all civilized nations as to correct these erroneous notions of its propagation. But the passage which is here quoted, deserves the reader's particular attention ; because all succeeding authors, not excepting the most judicious and intelligent physicians of the present times, would adopt Sydenham's language to express their ideas of the epidemical small-pox. To the continuance of this opinion it is highly probable that we owe the permanency of the small-pox. The hypothesis seems to have been originally Sydenham's. For his predecessor Riverius,† as well as his contemporaries Wil-

* Syd. Op. sect. ii. cap. ii. p. 108.

† Riv. Op. p. 548.

lis* and Morton† had adequate notions of the contagious nature of the small-pox. It is true that physicians, even from their great original Hippocrates, have mentioned peculiar diatheses of the air, but in a sense totally different from that of our illustrious author. On the present occasion, we need require no other proof than a letter dated the 30th of December 1679, to Sydenham, from Dr. Brady, royal professor of physick at Cambridge, and a celebrated historian. He remarks that 'neither physicians nor natural historians have given the slightest idea of, much less have thoroughly investigated the various alterations and changes which you have aptly denominated the constitutions of the atmosphere.' 'Alterationes multiplices & mutationes, quas Constitutiones haud perperam indigitas, ne leviter quidem, vel Medici, vel Historiae'

* De febribus, cap. xv. p. 128.

† De variolis, cap. vi. p. 92.

‘toriae

‘*toriæ Naturalis Scriptores attigerunt,
multo minus perscrutari sategerunt.*’^{††}

§ III.

The hypothesis of the great Sydenham has prevailed very generally among physicians during more than a century. The propagation of the pestilential, variolous, morbillous and other contagions is attributed to a peculiar *constitution* of the air by the most sagacious and judicious authors that have appeared since that period, as Mead,* Boerhaave,† Van Swieten,‡ Hoffman,§ Ramazzini,|| Huxham, ¶ De Haen, &c.**

And other
respectable
authors.

†† Syd. Op. p. 291. * De Variolis, p. 9.

† Aphor. 1380. † Aph. Comment. 1380.

§ Syst. Pract. T. II. S. i. C. vii. p. 56. De aëris potentia in epidemicorum morborum generatione, T. IX. § i. p. 500. || Constitutiones epidemicæ, p. 68. de hac variolosa constitutione, p. 105. ¶ Essay on the Small-Pox, p. 144.

** Ratio medendi, T. I. C. xii. p. 75. where he adopts the error in its full extent, as may be inferred from the expression *febris variolosa sine variolis*.

No one will deny that these are the most respectable authors who have written on the small-pox since the age of Sydenham. It is their universal opinion and language, without any hesitation or doubt, that some occult quality of the atmosphere is the cause of the propagation of the distemper, whenever it becomes epidemical. Sydenham attributes this quality to mineral exhalations from the bowels of the earth, but as he proposes the hypothesis without the shadow of an argument to support it, his conjecture has gained few or no proselytes among physicians of the superior knowledge of those above quoted. It is allowed that this quality is produced neither by moisture nor dryness, by heat nor coldness, nor by any other sensible temperature of the air. It is confessed to be an *occult* quality. No one has attempted to explain, much less to correct it. While such an opinion prevails, the wildest visionary can never

never entertain a hope to retard the progress of this destructive malady, except by prayers, and by recourse to the merciful interposition of Providence. It is astonishing, what implicit credit this pernicious doctrine has obtained, though positively contradicted and disproved by facts which lie open to every observer.

§ IV.

The small-pox has spread so widely over the world, and has, for so many ages, been allowed to destroy a very large proportion of mankind, that it is, and has long been, regarded as one of the necessary evils of humanity. This opinion so universally prevails among all, even the wisest men, that every attempt to exterminate, or even to regulate, and control the progress of this fatal distemper, may be thought too visionary and chimerical to de-

May be avoided by

serve

serve any serious attention. I am fully aware that great innovations are generally unpopular, and that men of established character are likely to treat a proposal, which contradicts inveterate prejudices, with ridicule and contempt. Awed, but not dismayed, by these expected difficulties, I have delayed, for twelve years, to publish this SKETCH, though, during that whole period, my thoughts have been anxiously employed on the subject, and not a medical doubt has occurred to me, concerning the propriety and practicability of such a measure. But no opportunity or effort, compatible with my professional duties, has been neglected to forward this important object.

As soon as the medical principles, upon which the following proposal is founded, had occurred to my reflection, so as to produce full conviction in my own mind, that the opinions which had hitherto fostered and

and preserved this pestilence among mankind, were utterly false and erroneous, I instantly communicated the ideas to my friends and correspondents. My arguments gave perfect conviction to some, whose clearness of discernment, and soundness of judgment, I had, for a long period of my life, regarded with almost implicit confidence. They made others doubt the pernicious doctrines which had been long and universally established. I have hitherto met with no professed disbelievers; much less any arguments or facts which furnish a solid foundation for such disbelief. The candid disquisitions of all my acquaintance have daily increased my conviction of the truth, and of the importance of the principles which discovered the practicability of extirpating the small-pox. They conveyed such convincing evidence to my own mind that, in a few weeks, I ventured to offer the *Rules for preventing the Small-Pox*, to the severe and decisive experience

experience of a publick establishment. On this foundation, in a few months, through the liberal sentiments and conduct of my medical brethren, and through the beneficent charities of my fellow-citizens, a society for that purpose was established in Chester. These new practical principles were thus submitted to the fairest and completest trial for *six* years, in a large town, where many hundreds of the inhabitants, who never had the small-pox, were mixed with others in all stages of the distemper, and yet were preserved from the infection, as far as they would submit to the following regulations.

§ V.

The rules of
prevention.

MANKIND are not necessarily subject to the
‘ SMALL-POX; it is always caught by IN-
‘ FECTION from a patient in the distemper,
‘ or the poisonous matter, scabs, &c. that
‘ come from a patient, and may be avoided
‘ by observing these

RULES

• RULES OF PREVENTION.

I. ' Suffer no person, who has not had
the small-pox, to come into the infectious
house. No visitor, who has any commu-
nication with persons liable to the dis-
temper, should touch or sit down on any
thing infectious.

II. ' No patient, after the pocks have
appeared, must be suffered to go into the
street, or other frequented place. Fresh
air must be constantly admitted, by doors
and windows, into the sick chamber.

III. ' The utmost attention to cleanli-
ness is absolutely necessary: during
and after the distemper, no person,
clothes, food, furniture, dog, cat, mo-
ney, medicines, or any other thing that
is known or suspected to be bedaubed with
matter, spittle, or other infectious dis-
charges of the patient, should go or be
carried out of the house till they be
washed; and till they be sufficiently
exposed

‘ exposed to the fresh air. No foul linen,
‘ nor any thing else that can retain the
‘ poison, should be folded up or put into
‘ drawers, boxes, or be otherwise shut up
‘ from the air, but must be immediately
‘ thrown into water and kept there till
‘ washed. No attendants should touch
‘ what is to go into another family, till
‘ their hands are washed. When a patient
‘ dies of the small-pox, particular care
‘ should be taken that nothing infectious
‘ be taken out of the house so as to do
‘ mischief.

IV. ‘ The patient must not be allowed
‘ to approach any person liable to the dis-
‘ temper, till every scab has dropt off;
‘ till all the clothes, furniture, food and all
‘ other things touched by the patient du-
‘ ring the distemper; till the floor of the
‘ sick chamber; and till the hair, face,
‘ and hands have been carefully washed.
‘ After every thing has been made per-
‘ fectly clean, the doors, windows, draw-
‘ ers, boxes, and all other places that
‘ can

can retain infectious air should be kept open, till it be cleared out of the house.'

Of these RULES, the reader's attentive consideration is particularly solicited. They are intended to comprehend every necessary, and to exclude every unnecessary regulation. It may indeed be allowed that some of them are not strictly indispensable; but, in point of practice, it appears doubtful whether any could be safely omitted, except under peculiar circumstances of medical inspection.

For the refutation of the dangerous opinions above quoted, though supported by the highest medical authority; for the elucidation of the principles on which these RULES are founded; and for proofs of their sufficiency to guard mankind from the ravages of this fatal pestilence, I have stated a very large body of evidence, of unquestionable accuracy and truth, in the IN-

QUIRY how to prevent the Small-Pox, and in the PROCEEDINGS of the Small-Pox Society of Chester. They have stood the severe trial of experience. The citizens of Chester, particularly the numerous and respectable members of this benevolent institution 'can all bear testimony that the experience of 'the society for six years has not excited 'a single medical doubt, that the RULES 'of PREVENTION, submitted to their 'consideration in the original proposal, 'have proved fully adequate to their 'purpose. A publick establishment, for 'so long a period, has supplied more numerous and more authentick facts than 'the private practice of any physician 'during his whole life.* If the principles were erroneous, or the rules defective, these errors and defects must have been discovered in many hundreds of instances. But lest one feeble voice should be neglected and despised, I have

* See the address prefixed to the INQUIRY how to prevent the small-pox, p. 5.

solicited

solicited original observations from the most intelligent and impartial of my medical friends and correspondents, on the only doubts that have, at any time, been suggested, namely, to determine the extent of the infectious atmosphere which surrounds a patient in the small-pox; and to ascertain whether clothes, &c. exposed to the variolous miasms were in any instance infectious.

Ever since the year 1777, I have requested the attention of many eminent physicians and surgeons to this subject. Being men of extensive experience, clear judgment, and sagacious discernment, they were peculiarly well prepared to answer the following queries which I addressed to them from eleven to thirteen years, and to the publick six years ago.

§ VI.

QUERIES.

The queries.

1. ' Do the *Rules of Prevention* contain no unnecessary restriction ?
2. ' Do they comprehend every necessary restriction ?
3. ' Did you ever know *three* or more persons, at the same time and place, all escape the small-pox, after being certainly exposed, for the first time, to the variolous infection, either by inoculation with genuine fresh matter, or by breathing the air of a chamber in which a variolous smell was perceptible ?
4. ' Did you ever know the small-pox conveyed out of one chamber into another, by a person who certainly did not carry any variolous serum, pus, or scab, on their clothes, hands, feet, &c ?

5. ' On

5. ' On the contrary, have you not known numerous instances of persons and clothes exposed to the miasms of a small-pox chamber, that soon after approached many liable to the distemper, who yet escaped infection ?'*

Having thus drawn the attention of these most respectable correspondents to this subject, for so long a period, a letter to the following purpose about three or four years since, was addressed to them.

' I was favoured with your criticism on the *Inquiry how to prevent the Small-Pox* in manuscript some years ago. These observations, I solicited, for my own private satisfaction. I now request the honour of your name if you continue to think that this dreadful pestilence may be avoided, by practicable regulations, and if you judge that the propagation of such

* See INQUIRY, p. 135.

‘ an opinion may be of service to man-
‘ kind. Beside other remarks, I re-
‘ quest your separate and explicit an-
‘ swers to all or to any of the *queries*
‘ above quoted. If you answer the
‘ first, third or fourth *query* in the
‘ affirmative, and the second or fifth
‘ in the negative, I desire a full and
‘ exact account of every circumstance
‘ respecting the facts on which such
‘ an answer is founded. In soliciting
‘ this favour, I need not say, that,
‘ both for your sake and my own, I
‘ cannot have the remotest wish, that
‘ you should vouch one word on any
‘ point where you have not received
‘ the clearest conviction. Though your
‘ entire approbation would give me
‘ great satisfaction, yet I should esteem,
‘ as much more important, the detec-
‘ tion of doubtful facts, bad reasoning
‘ or false conclusions. I send a letter
‘ on this occasion to all my surviving
‘ medical friends, who honoured the
‘ manuscript INQUIRY with their re-
‘ marks.

‘ marks. You will think this an unusual, and perhaps an unwarrantable method of establishing medical opinions; but, I trust, that the occasion may plead my apology. If the prevention of the casual small-pox shall appear to others in the same important light as it has long done to me, I hope and believe that a spirit of benevolence, and philanthropy would promote Societies to check the ravages of this dreadful malady, if a method of preventing it were generally known to be practicable. If such private institutions become successful, the best foundation will be laid for a general law.’

In answer to this letter, I received permission from many respectable physicians and surgeons publickly to produce their name and authority, expressing their full conviction, that the *Rules of prevention* contained every necessary and no unnecessary restriction.

But, on farther reflection, being apprehensive that such testimonies, though highly honourable, and, I believe, perfectly impartial, might be suspected to proceed from the solicitations of importunity, or the partialities of friendship, I resolved to publish no answers but what contained original observations. Medical men fully engaged in extensive practice, have little leisure to investigate opinions not intimately connected with their professional pursuits. However, accurate facts decisive of the doctrine on which the preventive measures are founded, may be collected by any observer who will take the trouble of making the inquiry. Such decisive facts may be collected in various methods. In a subsequent letter, to some of the most humane, active and intelligent of my medical friends, I have taken the liberty to suggest the following mode of investigation.

• A simple

‘ A simple *aye* or *no* to the QUERIES
‘ would be below your character, and
‘ do little service to the cause. On
‘ both considerations, your opinion
‘ ought to be supported by some *origi-*
‘ *nal* observations of your own. And
‘ these, I apprehend, may be obtained
‘ without much difficulty. The only
‘ doubts that can occur on this subject
‘ are discussed in the seventh and eighth
‘ propositions of the INQUIRY.

1. ‘ Probably from your own per-
‘ sonal knowledge, and certainly from
‘ inoculators, who daily visit patients
‘ in all stages of the small-pox, and
‘ others, immediately after, who are lia-
‘ ble to the distemper, you may easily
‘ ascertain numerous facts relative to the
‘ fourth and fifth *queries*. A full sum-
‘ mary of cases respecting the fifth
‘ would be highly to my purpose.’ See
the INQUIRY, p. 213.

2. ‘ You may perhaps have frequently
‘ observed small-pox patients in the
‘ near

PRELIMINARY

‘ near neighbourhood of children liable
‘ to the distemper, who yet escaped the
‘ infection. But, if no facts of this
‘ kind occur to your recollection, new
‘ observations might be made, by tak-
‘ ing a little trouble to search for them,
‘ in various ways, for instance, the
‘ following. In any large or small
‘ town, or village, where the small-pox
‘ now spreads or has been very lately
‘ epidemical: write a complete cata-
‘ logue of the children who had not
‘ previously passed through the distem-
‘ per: — Note the exact dates when
‘ each child was seized with the erup-
‘ tive fever: — Describe the situation
‘ of any family and the number it con-
‘ tains, who may have escaped the in-
‘ fection. An attention to the direc-
‘ tion of the winds during the epi-
‘ mick, and an accurate account of the
‘ distance of the infectious patients
‘ from those who were not infected,
‘ will suggest remarks of great im-
‘ portance. Inquire whether the pa-
rents

‘rents wished their children to have
‘the distemper, or to avoid it; and
‘what intercourse has actually taken
‘place between the infectious and those
‘who are liable to take the infection.
‘These facts may be ascertained by any
‘observer, and will shew to what a
‘little distance the contagion extends,
‘even when the distemper is most
‘epidemical, especially if some small
‘rewards be offered for the successful
‘observance of the *Rules of prevention.*’

As an example how facts of this kind may be collected and applied, see the INQUIRY, p. 93—108; 124—131; and 174—176.

§ VII.

Several very respectable Correspondents have declined to give a decided opinion on this subject, from want of opportunity to make observations in Answers.

in their own practice, A physician of the greatest eminence both in rank and erudition gives the following very sufficient reason for his silence on this point. ‘ In London, we have very few opportunities of seeing the small-pox. For the last five and twenty years, the number of variolous patients, who have fallen under my care, is very inconsiderable.’ Another distinguished physician and author in a large city says; ‘ I have not seen six private patients in the small-pox in eighteen years; and about seven or eight in the hospital, where it occasionally crept, no one knew by what means.’

The whole evidence against the *Rules of prevention*, which has been communicated to me is inserted in the annexed CORRESPONDENCE. Some of my very ingenious friends have stated objections to the *theory* which suggested the observation of facts. These doubts I have considered very deliberately and intend

intend to submit them, with their answers, to the judgment of the publick. But as the theory is merely a machine or scaffold, with which the fortress of facts was constructed, such disquisitions seem superfluous on the present occasion. It has no more connection with the permanency of the structure, than the frame work, or pile driver, invented for the erection of Westminster bridge, with the durability of that fabrick. The theory suggested the discoveries and conclusions contained in the INQUIRY, but is in no respect necessary for their support. It may be sufficient to observe, at present, that no objection which has been proposed, ever excited, in my mind, the slightest doubt of its philosophical truth: and I am firmly persuaded that it may suggest to others such views and such observations as will serve for the protection of mankind, against the destructive ravages of other pestilential contagions.

Though

Though the theoretical disquisitions of my ingenious Correspondents would be improperly introduced here; yet one quotation from a French Author, communicated in Dr. PERCIVAL's letter, may, with advantage be anticipated and brought forward to this place. The following experiments of Dr. O-RYAN require no theory for their illustration or support. They must strike every reader of sound sense with irresistible conviction, if we except a few, over whose minds inveterate prejudices may have a more powerful influence, than the light of reason. They afford however so clear, satisfactory and decisive a confirmation of the *Rules of prevention*, and of the doctrine, which the INQUIRY had attempted to establish, that they ought to be universally known, and I shall insert, in this place, a translation of the whole section.*

* *Dissertations sur les fievres infectieuses et contagieuses.*
Par M. O-RYAN D. M. de l'Université de Montpellier,
Professeur en medecine agrégé au collège de Lyon.
Voyez, p. 37.

V A R I O-

§ VIII.

VARIOLOUS MIASMS.

‘ If the last observations of the O-Ryan’s learned Dr. Paulet do not prove that experiment. contact is absolutely necessary for the propagation of the small-pox, we ought at least to conclude from them, that the sphere of activity of the variolous miasms is extremely limited; in fact, the more attentively we consider this subject, the more we shall be convinced, however dangerous this distemper may be, that there is no risk of contracting it, provided the person who is liable to infection, keeps himself at a very little distance from patients in the small-pox, or from things which they have touched.

‘ For the purpose of throwing some light on this interesting subject, I have made many experiments with the matter of the small-pox and of the

‘ the measles : they have constantly
‘ furnished me with the following
‘ conclusions, and I engage that they
‘ will give the same conviction to all
‘ who may repeat them.

“ I have established a house in the
‘ neighbourhood of this city (Lyons)
‘ for the reception of inoculated pa-
‘ tients. Many people falsely per-
‘ suaded that, a person infected by a
‘ good kind of small-pox, would have
‘ the distemper in the like favourable
‘ manner, brought their children to
‘ visit my patients with an intention
‘ that they should be infected by a
‘ communication with those who were
‘ inoculated.

‘ After many unsuccessful attempts
‘ to convince these people of their
‘ error, seeing that they rejected my
‘ offers to inoculate these children,
‘ and not doubting in spite of my
‘ arguments and express prohibition,
‘ that

‘ that sooner or later they would seize
‘ another and perhaps a less favourable
‘ opportunity, I exposed them to the
‘ following experiments, after they had
‘ undergone a due course of preparation.

‘ I placed a large dossier of cotton,
‘ soaked in variolous matter, on the
‘ middle of an oval table whose least
‘ diameter was three feet: I seated six
‘ children around it, three on each
‘ side of the table, in such a manner,
‘ that all were situated within half a
‘ yard of the infectious cotton. This
‘ experiment was sometimes made in
‘ the open air, sometimes in the house;
‘ I took care to renew, every second
‘ day, both the variolous matter, and
‘ the substance which contained it:
‘ I alternately used the poison taken
‘ from the inoculated and from the
‘ casual small-pox; and I copiously
‘ impregnated with it balls of cotton,
‘ lint, wool and silk. This operation,
‘ repeated during a whole week, morn-

G ing,

‘ ing, noon, and night, for an hour
‘ at each sitting, produced no effect.

‘ I then sent away the children,
‘ desiring the parents to acquaint me,
‘ in case any indisposition appeared,
‘ and to bring them to me a fortnight
‘ afterwards, although no alteration
‘ should have taken place in their
‘ health. I declare that, not only for
‘ that term, but for many succeeding
‘ months, during which I took care
‘ frequently to visit them, they all
‘ enjoyed perfect health. It was not
‘ till nine months after this time that
‘ four of these children had a mild
‘ kind of small-pox.

‘ Having concluded from these ex-
‘ periments, that the children could
‘ not have escaped infection, but be-
‘ cause the variolous matter might
‘ have lost that spring and that degree
‘ of energy, which, perhaps, it may
‘ possess, on arising immediately from
‘ the

‘ the human body, I placed a person
‘ in the eruptive fever of the small-pox
‘ by inoculation, at the distance of
‘ about half a yard from four children
‘ properly prepared; each exposure
‘ continued one hour, and was repeated
‘ daily for a fortnight, reckoning from
‘ the commencement of the fever till
‘ the pustules were become perfectly
‘ dry: not one of the four received the
‘ infection. Two months afterwards,
‘ I inoculated three of these children;
‘ they had the distemper in a very mild
‘ manner and recovered without diffi-
‘ culty.

‘ Like experiments made with the
‘ blood, and with the slimy matter
‘ which runs from the eyes and the
‘ nose of persons attacked by the mea-
‘ sles have uniformly had the same
‘ result.’*

* See the original, in the CORRESPONDENCE; Dr. Percival's letter.

Compared
with obser-
vations at
Chester.

§ IX.

These experiments of Dr. O-Ryan which are imagined and executed with great judgment and a happy boldness, very nearly determine the important question ‘to what distance the infectious atmosphere surrounds the variolous poison or patient.’ Few circumstances seem to have been omitted in this instructive narration. If the time had been exactly ascertained, which elapsed between taking the pus from the pustules and exposing the children to the miasms which arose from it, the experiment would have been still more decisive. However, as the variolous matter was frequently changed, in order to be fresh, we may fairly presume that the interval was as short as possible. This circumstance is of great importance; even the delay of a minute, while exposed to the open air, might rob the pus of a large proportion

portion of its poisonous miasms. Indeed, this uncertainty is very satisfactorily removed by the exposure of children around a patient in the small-pox. If the number of pustules on the inoculated patient had been mentioned, almost every possible doubt must have been completely satisfied. Some might farther have inquired whether the small-pox, at the season of these experiments, was epidemical in the neighbourhood: but we may fairly presume, in so large a city as Lyons, that the distemper is never absent, and, if minute inquiry had been made, it would have been discovered spreading in some quarter, though absent in others.

Compare these excellent *experiments* with the numerous *observations* contained in the 'INQUIRY how to prevent the Small-Pox.' In the eighth proposition, many authentick facts are produced to prove that the air is ren-

dered infectious but to a little distance from the variolous poison. In particular (p. 100.) though a young lady and two young gentlemen, on the walls of Chester, passed, within *half a yard of* a child with a moderate number of variolous pustules, and scabs upon it, in an infectious state, yet my argument leads me to conclude, in the high degree of probability of *several thousands to one*, that they did not approach within the infectious atmosphere of the patient. The coincidence of this and many other *observations* circumstantially related in the INQUIRY, with Dr. O-Ryan's *experiments*, must strike conviction into the mind of every reader capable of forming a judgment on such a subject. It is highly probable that these *experiments* were devised and executed without any previous knowledge of my *observations*, which adds great force to their authority. When the same conclusion is deduced from two different and separate

rate

rate modes of investigation, unconnected and unknown to each other, the conviction of its truth becomes incomparably clearer and more satisfactory. The INQUIRY was published in the autumn of 1784, and the approbation of Dr. O-Ryan's DISSERTATIONS *sur les Fievres infectieuses*, in manuscript, is signed by Dr. Paulet in April 1785. It is true, that the *observations* made in 1777 were circulated very generally among my medical friends, and it is just possible to suppose that Dr. O-Ryan, whose whole dissertations shew that he is intimately acquainted with the opinions of English authors, might have come to the knowledge of them; yet no trace of analogy in his mode of making the experiments seems to correspond with the facts which had occurred to me.

Paulet's
hypothesis.

§ X.

These very satisfactory, and indeed decisive experiments of Dr. O-Ryan appear plainly to have been suggested by an history of the small-pox written by Dr. Paulet, and published at Paris in 1768. The principal object of this author seems to be, as others of his countrymen, and of some German writers had before been, an attempt to prove that the small-pox was never propagated through the medium of air, but always by the immediate contact of the poison. 'To be convinced of this truth' he says, 'we need only make a very simple experiment; let a dozen children be placed in the same chamber; let six of these be in the casual, or inoculated small-pox; it matters not which, as both kinds are contagious. Let these children be so placed that a variolous patient be adjoining to a healthy child, and, so

‘ so intermixed, let them be separated
‘ from each other by a partition of
‘ such a height as to prevent all com-
‘ munication among them; but which
‘ allows them to breathe the same air:
‘ let these children be kept in sight
‘ and served with care by persons ap-
‘ pointed for the purpose: we shall
‘ observe, that, though they all have
‘ breathed the same air, and though
‘ they are all exposed to the putrid
‘ miasms which arise from the bodies
‘ of the patients, the six healthy chil-
‘ dren will remain uninfected: but
‘ these, who are not infected by breath-
‘ ing this atmosphere, easily take the
‘ distemper by *touching* the pus, or
‘ the scabs of the small-pox. We
‘ shall thus be convinced of this truth,
‘ that the variolous poison is not vo-
‘ latile; that no effluvia are capable
‘ of communicating the small-pox;
‘ but that *touching* the variolous matter
‘ is indispensably necessary to catch the
‘ infection; and that the air can never
‘ contain this distemper.’

‘ Pour s’en convaincre, il n’y a qu’à faire
‘ une expérience toute simple ; qu’on mette
‘ dans une chambre douze enfans ; dont
‘ six auront la petite vérole naturelle ou
‘ artificielle ; n’importe, toutes les deux
‘ peuvent être communiquées. Que ces
‘ enfans soient placés de façon qu’un sain
‘ soit après un malade, & qu’ainsi entre-
‘ mêlés, ils soient séparés les uns des au-
‘ tres par des cloisons d’une certaine hau-
‘ teur, qui coupent toute communication
‘ entre eux ; mais qui ne les empêchent
‘ pas de respirer le même air ; que ces
‘ enfans soient gardés à vue & servis avec
‘ précaution par des personnes particuli-
‘ eres : on verra que quoique tous aient
‘ respiré le même air, qu’ils aient tous été
‘ exposés à ces miasmes putrides qui s’élé-
‘ vent du corps des malades ; il n’y en
‘ aura que six qui auront eu la petite vé-
‘ role, tandis que les six autres ne l’auront
‘ point ; & si on répète l’expérience que
‘ je demande avec instance, & si ceux qui
‘ n’auront pu être infectés par cet atmo-
‘ sphère, prennent ensuite fort aisément la
‘ maladie,

‘ maladie en touchant le pus, ou les crottes de petite vérole, &c. Alors on se convaincroit de cette vérité, que le virus variolique n'est point volatil ; qu'il n'y a point de vapeurs capables de donner la petite vérole ; mais qu'il faut en toucher la matière pour la prendre ; & que l'air ne sauroit jamais se charger de cette maladie.*

Again (tom. I. p. 350.) he proposes very nearly the same experiment.

‘ Avant de prendre aucune précaution pour se délivrer de la petite vérole, il seroit nécessaire de faire une expérience qui mit une vérité dans tout son jour ; ce seroit de prendre vingt enfans, dont dix auroient la petite vérole, & les dix autres seroient sains : qu'on place tous ces enfans dans une chambre, de façon qu'ils ne puissent pas se toucher ; mais qu'ils respirent le même air : & si au bout de vingt ou trente jours, la moitié

* Hist. de la Petite Vérole, tom. I. p. 213.

‘ qui

' qui étoit saine, est dans le même état ;
 ' c'est-à-dire, n'a pas pris la petite vé-
 ' role : alors on ne pourra plus douter que
 ' l'air n'est point le véhicule de cette ma-
 ' ladie ; alors on sera convaincu qu'elle est
 ' contagieuse dans toute la rigueur du
 ' terme.

This idea seems to be so strongly impressed on his mind, that the boldest and most dangerous assurances are employed to influence the reader's imagination and produce his conviction.

' If an inoculator's box,' he writes,
 ' were passed under the nose of a hun-
 ' dred thousand people, not one of them
 ' would be infected : and it is as useless
 ' to search for the seeds of the small-
 ' pox in the air, as to seek there for
 ' the seeds of the leprosy, the plague,
 ' the itch, the measles, the scarlet
 ' fever, the venereal disease, &c.'

' Un Inoculateur feroit passer sa boëte
 ' sous le nez de cent mille hommes, sans
 ' que

‘ que personne prît la maladie : et il est
 ‘ aussi inutile de chercher les semences de
 ‘ la petite vérole dans l’air, que d’y cher-
 ‘ cher celles de la lepre, de la peste, de la
 ‘ gale, de la rougeole, de la fievre rouge,
 ‘ du mal vénérien, &c.*

The intelligent reader will observe that these positive and pernicious doctrines are merely hypothetical and gratuitous ; they are supported neither by observation, nor experiment, nor even by any plausible theory.

§ XII.

Dr. Paulet’s history being mentioned in terms of great praise by De Haen in his *Ratio Medendi*, I endeavoured to obtain a copy of it many years ago, but without success. On circulating

Controvert-
ed in the
French
translation.

* *Memoire pour Servir de Suite a l’Histoire de la Petite Verole*, p. 20. See the same doctrine expressed in the most positive language, in other parts of this *Treatise*, p. 12.

the

the INQUIRY *how to prevent the Small-Pox* among my medical friends, one of them, a very respectable physician, informed me, that he had received a favourable report of the publication from Signior Volta, at the time he was in England, and thought it might contain some facts or observations of importance to the questions considered in the INQUIRY. I now was more fortunate in obtaining a copy of the book, but found it so little to my purpose that it did not suggest a single correction or improvement in the intended publication. I was unwilling to criticize, and being unable to adopt his ideas, I was silent. But when Dr. De la Roche sent me the intelligence that he intended to translate the INQUIRY into the French language, these erroneous opinions appeared to me so likely to lead to dangerous consequences in the country where they were generally propagated, that I wrote the following remarks, which

he

he translated and added to the French edition as a

POSTSCRIPT,

Communicated to the Translator by the Author.

‘ IN the preceding INQUIRY, no direct notice has been taken of an opinion maintained by some physicians, that the variolous infection is caught by *contact* only, and never through the medium of air. It seemed unnecessary to enter into a refutation of this doctrine, as none of my countrymen had adopted it. But several ingenious authors in France, and other parts on the continent of Europe have endeavoured to propagate this notion;* [and that most respectable

* The sentence between [] is omitted in the translation, and the omission is thus explained in Dr. De la Roche’s letter to me dated the fifth of September 1786. I immediately translated your postscript, and had it printed at the end of the book; but the *censeur* has obliged me to take off that period of it which relates to the Royal Society,

‘ spectable body of physicians and philosophers the Royal Society of medicine at Paris, have so far given it their countenance, as to propose a prize question to determine, whether the infection of the small-pox can be conveyed through the medium of air.] Since this INQUIRY is to be honoured with a translation into the French language, I think it my duty to at-

‘ Society, though, not suspecting it might be taken amiss, I had already got it printed.’

If the *censor* exerts his authority over medical observations, which relate mere matters of fact, it cannot be expected that he will allow any free discussion of religious or political opinions. It appears wonderful that French authors, under such arbitrary restrictions should have so honourably enlarged the bounds of human knowledge, in every branch of science. When they have obtained the inestimable blessings of personal and political liberty and are allowed to display the full energies of their minds: as free from democratical as monarchial despotism, what important discoveries may we not expect from so enlightened, and ingenious a people? Such a prospect is highly delightful to the philanthropist and the philosopher; it cannot I hope, be inconsistent with the genuine spirit of a true patriot.

‘ tempt

tempt a refutation of what appears to me a very dangerous doctrine, by shortly recapitulating, and by placing in one view, some facts and arguments, which are dispersed in different parts of the Dissertation, and related to prove other propositions.

It is maintained (p. 18.) that "the casual small-pox may be propagated without immediate contact of the patient or of the poison, and that the distemper is communicated from the infectious to the infected through the medium of air. Because the variolous matter applied to a wound or to the inside of the nostrils,* or to the whole skin,† produces the inoculated small-pox. So that the casual small-pox appears to be *always* communicated through the medium of air."

This argument rests on two points

* Mead de variolis. cap. v.

† Van Swieten. tom. V. p. 27. Phil. Trans. No. 375. and 1768. XVII.

‘ of evidence: that is, firstly, on the
‘ appearance of an inflamed and sup-
‘ purated ulcer, which *uniformly* suc-
‘ ceeds variolous infection by contact,
‘ and precedes the eruptive fever; and
‘ secondly, on the difference univer-
‘ sally acknowledged, between the ca-
‘ sual and the inoculated small-pox:
‘ the latter disease is *never* produced
‘ but by the contact of variolous poi-
‘ son. The intelligent reader, who
‘ duly considers the number and the
‘ authenticity of the facts which evince
‘ this conclusion, must perceive its
‘ truth, with the clearest conviction.
‘ However, as the error here consi-
‘ dered must be pernicious to mankind
‘ in proportion as it is propagated, the
‘ utmost care and attention will be well
‘ employed for its correction. Many
‘ undoubted facts have occurred to my
‘ knowledge, where the small-pox was
‘ communicated to a person who never
‘ came in contact with the poison. But
‘ it may be sufficient to quote two
‘ cases,

“ cases, as they afford the clearest and
“ most unexceptionable evidence, which
“ can possibly be produced. “ A daugh-
“ ter of the late Rev. Mr. Harwood’s
“ passed near, but *did not touch* a child
“ who had the small-pox in the *Row*
“ (a kind of covered gallery or piazza,
“ open on one side to the street) at the
“ bottom of Northgate-Street, Chester,
“ and sickened of the distemper on the
“ eleventh day after this infection.” *
“ Again, Miss Archer’s brother† passed
“ within half a yard of a child in the
“ small-pox, on the walls of Chester.
“ He expressed a curiosity to look at the
“ small-pox patient, stopt a little mo-
“ ment when opposite to it, and about
“ a minute, when they had passed each
“ other, to the distance of some yards.
“ The young lady is *certain* that he did
“ *not touch*, but thinks that he ap-
“ proached nearer to the child than her-
“ self, or any of the rest. This bro-

* See INQUIRY, p. 32.

† p. 99.

“ ther was seized with the small-pox
“ on the tenth day after this interview.”
‘ There could not be, in either case,
‘ the least possible suspicion of infec-
‘ tion from touching clothes, &c.
‘ through inadvertency, an event which
‘ might happen in a sick chamber. In
‘ one, the fever began on the *tenth*, and
‘ in the other, on the *eleventh* day
‘ after breathing the infectious air; this
‘ is well known to be the most usual
‘ period, between infection and the
‘ commencement of the casual small-
‘ pox.

‘ The French and English nations
‘ have long been rivals in the arts and
‘ sciences which promote the misery
‘ and the destruction of the human race.
‘ That, in future, they may be in-
‘ spired with the glorious emulation of
‘ excelling each other in that know-
‘ ledge whose object is the happiness
‘ and preservation of mankind, is the
‘ sincerest and most fervent wish of

J. H.

CHESTER, 31st March 1786.

§ XIII.

On this occasion, it may be useful to take notice of the troublesome practical consequences which would result from this fanciful hypothesis of Dr. Paujet. He admits, without doubt or hesitation, and adopts from very vague and uncertain intelligence an opinion that 'the variolous poison preserves an infectious quality, for a hundred days, although exposed to the vicissitudes of the air.'* Mark the difficulties which would result from this doctrine. The methods of disinfecting the patient, furniture, &c. would be vague, complicated and expensive. He observes that 'a decoction of juniper; the gum dragon dissolved in vinegar; a solution of marine salt, or sea water;

Hypothetical difficulties.

* 'Le virus de cette maladie conserve la vertu de la renouveler, jusqu'à cent jours, quoiqu'exposé au intempéries de l'air.' Avis au Public. &c. par M. Paulet. Pr. VII. p. 43.

' that any one of these remedies is
 ' sufficient to purify the skin of a
 ' patient after the scabs of the small-
 ' pox have dropt off his body and skin.
 ' That hot wine or oxycrate would
 ' nearly produce the same effect, and that
 ' washing the whole skin with one or
 ' other of these lotions is *always* neces-
 ' sary at the conclusion of the disease.*
 He farther remarks that ' the disinfec-
 ' tion of furniture requires a very dif-
 ' ferent method from that of the skin.
 ' We must use applications that would
 ' be injurious to man. Fire is to be reck-
 ' oned of the most powerful means ; it
 ' purifies every thing. But as one cannot
 ' burn all, one may employ instead of it
 ' a boiling wash of alkaline lye, arsenic,
 ' antimony, sulphur, and especially

* ' Une décoction de genievre ; la gomme adragant
 ' dissoute dans le vinaigre ; une dissolution de sel marin, ou
 ' l'eau de mer ; un seul de ces remedes suffit pour purifier
 ' la peau d'un malade après la chute croutes. Le vin
 ' chaud ou l'oxicrat, produisent à-peu-près le même effet ;
 ' & une lotion générale quelconque sur la peau, est toujours
 ' nécessaire à la fin de la maladie.' Avis au Public p. 45.

cinnabar

‘ cinnabar, the most powerful of all
 ‘ these drugs. With these materials,
 ‘ fumigations are to be made, which
 ‘ are most powerful and capable of
 ‘ disinfecting, in a short time, all the
 ‘ furniture which is exposed to their
 ‘ vapour while burning. If these me-
 ‘ thods of purification cannot be em-
 ‘ ployed, we may use tobacco, vinegar,
 ‘ gun-powder, juniper, or other aro-
 ‘ maticks.’ *

* ‘ La désinfection subite des meubles exige une
 ‘ méthode bien différente de celle de la peau. Il faut
 ‘ employer des matières dont l’application seroit per-
 ‘ nicieuse à l’homme. Parmi les secours les plus puissans,
 ‘ celui du feu doit être compté le premier ; il purifie tout.
 ‘ Mais comme on ne peut pas tout brûler, on emploie à
 ‘ sa place la lessive bouillante, l’arsenic, l’antimoine, le
 ‘ souffre, & sur tout le cinabre, qui est la plus puissante
 ‘ de toutes ces drogues. C’est avec ces matières qu’on
 ‘ fait les fumigations les plus fortes & les plus capables de
 ‘ désinfecter, en très-peu de tems, tous les meubles qu’on
 ‘ expose à leur vapeur lorsqu’on les brûle. A leur défaut
 ‘ on emploie le tabac, le vinaigre, la poudre à canon, le
 ‘ genievre & les plantes aromatiques.’ Avis au Public
 p. 46.

§ XIV.

Groundless.

We cannot possibly have faith in such loose, contradictory, and random directions. Not a single fact is produced to support these opinions; they are all purely hypothetical. To remove the visionary fears and apprehensions that must arise as necessary consequences from such doctrines, it may be useful and satisfactory to remark that the same facts which prove that an infectious quality is communicated to the atmosphere by the variolous poison, contain a strong presumptive proof that this infectious quality will soon be exhausted, by exposure of the poison to the atmosphere. As this point is of much consequence in establishing accurate and efficacious measures of prevention, an illustration of it by exact analogies, will not be deemed superfluous or impertinent. Take an ounce of green tea, pour upon it a pint of boiling water;

water; which will soon be impregnated with the flavour, astringency and other sensible qualities of the tea. If the first infusion be drawn off, and a second pint of fresh water be poured upon the tea, it will also acquire some taste; so may a third, fourth, or more affusions of water. But as each pint of water takes away part of these qualities from the tea, the whole must soon be exhausted. Even the Peruvian bark, which communicates its qualities to a larger quantity of water than most vegetable substances, imparts neither bitterness nor astringency to the twenty-fifth affusion of water.* A physician would not prescribe even the second infusion for the purpose of curing a common ague.

The mode in which the variolous infection impregnates the atmosphere, is analogous to the infusions of vegetables in water. Facts, which have

* See Percival's Essays, vol. I. edit. fourth, p. 55.
been

been ascertained with the most faithful accuracy, prove, that the variolous poison quickly communicates an infectious quality to the atmosphere which surrounds it. As the air is an elastick fluid, and, as it is constantly in motion, on every change of temperature, its particles, in quick succession, will approach to and recede from the matter of the small-pox. On these considerations, we may fairly conclude, that the variolous poison exposed to the open air or even to the air of a chamber (through which there generally circulates a constant current of fresh air, by means of various crevices in the closest room, besides chimneys, windows and doors) must soon be deprived of its infectious quality.

On this point, two cases will suggest themselves to the medical reader, as objections to the conclusiveness of this argument. A small particle of musk will scent the neighbouring air for months or years; and a cup of antimonial

monial glass will communicate an emetic quality to wine, for a long period of time, without much diminution of its weight. These are rare and perhaps the only exceptions to the general analogy of nature, which might be supported by several thousands of facts from each of the animal, vegetable and mineral kingdoms.

Dr. Paulet, in consequence of his hypothesis, that the small-pox is never communicated but by contact of the variolous poison, has proposed a method of extirpating the distemper ; which indeed would be a very easy project, if, as he asserts, it were as easy to be avoided as the itch. Yet hypothetical conjectures have involved his scheme in many groundless and visionary perplexities. Some of these have been before mentioned ; on this occasion, I shall select one other among the various superfluous difficulties which he has proposed in the execution of his plan. ' To prevent infection, it will be necessary to form a barrier around the patient's

' patient's béd, like a screen, whose
 ' height should be about three feet,
 ' which shall surround the bed in such
 ' a manner that those who are in the
 ' chamber, cannot touch with extended
 ' arms, either the bed or the patient.'*
 ' The barrier of the bed should be
 ' fixed, it should have only one door,
 ' of which the nurse must always keep
 ' the key: the barrier must be closely
 ' joined to the partition by means of
 ' clay, plaster, or some such substance,
 ' that no kind of dirt can possibly pass
 ' between them.'†

* 'Pour cet effet on formera une sorte de barriere
 ' autour du lit du malade, semblable à un paravent qui
 ' entoure le lit, dont la hauteur sera de trois pieds environ,
 ' & qui fera le tour du lit, de façon que ceux qui pour-
 ' roient être dans la chambre, ne puissent toucher ni le lit,
 ' ni le malade, en étendant les bras.' Hist. de la Petite
 Verole, tom. I. p. 352.

† 'La barriere du lit sera fixe, il y aura une porte,
 ' dont la garde seule aura la clef; on fera joindre ex-
 ' actement cette barriere avec le parquet, au moyen de
 ' quelque tefre grasse, argilleuse, ou bien avec du plâtre,
 ' ou toute autre matiere semblable, afin que les ordures
 ' ne puissent pas passer entre deux.' Hist. de la Petite
 Verole, tom. I. p. 355.

The

The expence of erecting such a fixed barrier in every sick chamber would be so great and the inconveniences so numerous, as alone to render the whole plan impracticable and abortive. Many other objections might be urged against this proposal; but it seems unnecessary to state them. Enough has been said to explain why such an impracticable, inadequate and expensive project has never been attempted.

With great reluctance and regret I have thus expressed my objections to some opinions advanced in Dr. Paulet's History of the Small-Pox, a publication which in many respects displays much learning, good sense, patriotism and philanthropy: but the cause of truth and of humanity warrants and requires that the pernicious errors above stated should be freely confuted.

§ XV.

After very mature deliberation, I shall venture, but with great deference and diffidence, to propose some publick measures for the prevention of the small-pox. The medical principles are not founded on conjecture, but on the evidence of well authenticated facts, as explained at large in the *INQUIRY how to prevent the small-pox, and in the proceedings of the small-pox society at Chester*. I have too great a respect for the publick opinion, and regard for my own character to solicit their attention on any ground short of full and clear conviction. Strongly impressed with the great importance and the truth of the medical conclusions, it will not, I hope, be thought too presumptuous in an humble individual to offer the *OUTLINE* of a plan to exterminate the small-pox from this island. It is the happy privilege of every

every Englishman freely and boldly to propose to the publick, and, by some connection, to the legislature, any law which he conceives might be conducive to the national prosperity and happiness. But I never entertained the remotest intention of offering a law. The proposal may include civil, if not political considerations, yet I mean merely to explain medical ideas. Though the regulations here proposed are simple and easy compared with any other that have been offered to the publick, yet to introduce, and much more to execute them, I am well aware, would require all the influence of a truly patriotick prince, with a wise, steady and popular administration, who have more anxiety to act worthily in their high stations, than to keep them, and who are actuated with an uncommon degree of ardour, to promote the good of their country and of mankind. As the *proceedings* of the small-pox society in Chester contain a

minute

minute detail of all the circumstances which occurred in the practical application of the *rules of prevention*, and comprehend every improvement which six years of attentive experience and observation could suggest, I have nothing better to propose upon that head. Every hint that occurred during the transaction of this business, was readily adopted by my candid medical brethren, and by the other charitable members of the society. On these considerations I would humbly offer these *proceedings* as the foundation of a publick establishment. Experience on a larger scale would undoubtedly discover annual amendments, which the legislature would readily adopt.

S K E T C H

OF A PLAN TO EXTERMINATE THE

SMALL-POX.

P A R T II.

Il faut conclure que l'Europe est encore aujourd'hui dans le cas d'avoir besoin de Leix, qui favorisent la population de l'Espèce humaine. Montesquieu. De l'Esprit des loix. liv. 23, ch. 26.

Proposed OUTLINE of a PUBLICK ESTABLISHMENT, to exterminate the CASUAL SMALL-POX from Great Britain: to introduce GENERAL INOCULATION.

§ I.

WHEREAS the casual small-pox has been for many centuries and continues to be, fatal to a large proportion of the inhabitants of this island: and whereas it has been made highly probable, both

I from

Outline.

*from reason and experience, that this dreadful pestilence might be prevented, if the poison with which it is propagated, were seasonably destroyed, by a strict observance of the Rules of prevention: * it is proposed,*

1. *That every Sunday, in all places appointed for divine worship, publick prayers be offered up to ALMIGHTY GOD, graciously and mercifully to bestow the blessings of his kind Providence on our humble endeavours, to exterminate from this kingdom so dreadful a calamity.*

2. *That a law be enacted to reward the observance of the Rules of prevention, by poor families: that the reward of a punctual and successful observance of the Rules be at the rate of threepence, of sixpence, of one shilling or of a day, (to be varied according to circumstances, at the discretion of Justices of peace) during the whole period that the patients remain in an*

* See them, p. 62—65.

infectious

infectious state. That to such families as require no pecuniary reward, publick thanks be given, either in the parish church, or a neighbouring news-paper, or

Though the RULES of prevention are simple, and intelligible to the meanest capacity, yet it requires little acquaintance with the world to be aware of the numerous impediments that would be experienced to their introduction, among the bulk of mankind. An adequate motive must be provided to secure the obedience of each rank of people. With the lowest class, there would be the greatest difficulty: to them, a pecuniary reward would be indispensably necessary, both as a motive to excite their attention to the RULES, and as a recompense for the inconveniences they might occasion.*

3. *That*

* The proceedings of the Chester society will afford an illustration, and, till a better mode can be devised,

PROPOSED OUTLINE OF A

3. *That a transgression of the rules be punished by a fine of £10, or £50, or ; one half to the informer, and the other half to the fund, which supplies the expence of rewards, for their successful observance*

an example, how the meritorious behaviour of poor families may receive an adequate remuneration; at the same time, all possible care is taken to guard against imposition, and unjust claims, by the conditions of the annexed

PROMISSORY NOTE.

DATED,

‘ The SOCIETY for promoting general inoculation, at stated periods, and for preventing the natural SMALL-Pox in Chester, promise to pay to the sum of on condition that the said and family exactly observe the rules of prevention; and allow any member of the society, or their inspector, to inquire whether they are exactly observed. And as a farther encouragement to follow these directions attentively and faithfully, the society promise [double or—] the reward, if no neighbour or acquaintance be attacked by the small-pox, during the time it is in the family of the said nor within three weeks after all the scabs have entirely fallen off the family.

‘ By Order of the Society.

‘ Inspector.’

‘ N. B. Both the rewards may be obtained with little trouble and no expence. The money will be paid at the

observance by the poor. That the crime be published in the nearest news-paper. That the offender, who cannot pay the fine, be exposed in the nearest market town, for an hour, with this label on his breast ;

“ Behold a villain, who has wilfully,
“ and wickedly spread the poison of
“ the small-pox.”

4. That Great Britain be divided into districts, including a certain number of parishes or townships. That to each of them a surgeon or apothecary be appointed as INSPECTOR, to see that the regulations are exactly observed.

Inspectors'
Districts.

5. That about five hundred INSPECTORS be appointed for England and for Scotland. That the districts be divided according to the rate of population; in proportion to the number raised, or returned capable of serving,

‘ the board room of the Infirmary, at eleven o'clock in the morning, the first Tuesday of the month next after it becomes due.

‘ A shilling will be immediately given, by the Inspector of the district, to any person who first informs him that a fresh family is infected by the small-pox.’

as militia-men, in each parish or township, in England; and as fencibles in Scotland.

There are about thirty-two thousand militia-men in England. If this number were divided by five hundred, there would be sixty-four for each INSPECTION. In the distribution of districts, attention should be given to keep, as near as possible, to this or some other more proper medium in regard to size. But as no district should divide a parish, or a township, this and other local circumstances must occasion considerable variations from the proposed standard.

To form some probable conjecture of the size and number of INSPECTIONS, it will be proper to consider that the whole extent of England comprehends about fifty thousand square miles. If it were divided into five hundred equal portions, each of them would contain about one hundred

hundred square miles. If the INSPECTOR were placed near the centre of his DISTRICT, he would not be much more than five miles distant from its boundary. However, in parts of the country which are thinly inhabited, an INSPECTION would be considerably more extensive. But, in these very situations, the INSPECTOR's office would be most easily executed. His visits, though more distant, need be much less frequent. On the contrary, not only in towns, but, even in populous parts of the country, the INSPECTOR would be situated, within much less than five miles of the remotest part of his DISTRICT.

6. *That a physician be appointed DIRECTOR of ten or*

Director's
Circuit.

INSPECTORS.

By this distribution a DIRECTOR'S CIRCUIT would comprehend six hundred and forty militia-men, and include about one thousand square miles, and

if the DIRECTOR were situated near its centre, his distance from the remotest part of it would not exceed sixteen miles; for $32 \times 32 = 1024$.

Commis-
sioners.

7. *That a COMMISSION of five, or physicians be appointed in London, and another of three, or physicians in Edinburgh to superintend the proceedings of the DIRECTORS and INSPECTORS in each kingdom.*

8. *That the COMMISSIONERS be appointed by his MAJESTY, or by the COLLEGE of PHYSICIANS, or ; that the DIRECTORS be appointed by his MAJESTY ; or, by the justices of peace ; or by the gentlemen who are nominated in the commission of justices of peace ; or that the INSPECTORS be appointed by his MAJESTY, or by the COMMISSIONERS, or by the DIRECTORS, or by the justices, or by .*

9. *That the INSPECTOR be required daily to visit all infectious families in the town where he resides, to see that they observe*

observe the rules. That, in the country, his visits may be less frequent, the distemper being more dreaded there, less liable to spread, and appearing at longer intervals. That the INSPECTOR keep a register of the small-pox, and a review of visits (according to a form * properly printed in columns) with the greatest exactness. That he be empowered to grant to poor people the promissory note of six-pence, or of a shilling, or a day, from its date, till all infection has ceased in the family; on condition that they faithfully and successfully observe the rules of prevention. That he use all his influence to induce families of the middle and higher rank, to prevent the small-pox from spreading. That he attentively investigate the means by which infection is communicated to every fresh family. That he send a copy of the register and review, on the first day of every month to the DIRECTOR of the CIRCUIT.

* See the INQUIRY, p. 122.

10. That,

10. That, as the visits of a stranger, would, in some cases, be disagreeable, any person may have the privilege to recommend a reputable surgeon, or apothecary, to the DIRECTOR of the CIRCUIT as INSPECTOR of his or her own family: whom, if approved, the DIRECTOR may constitute a temporary INSPECTOR; on condition, that the family, who requests such a favour, engage to pay him an adequate reward for his trouble: that the appointment, and acceptance of the trust, be regularly declared: that the temporary INSPECTOR be made answerable for the punctual observance of the rules: that he keep an exact account of all proceedings: that he accurately report them to the publick INSPECTOR, to be fully entered in the register of the DISTRICT: that he be required to pay strict obedience to the instructions and admonitions of the INSPECTOR, DIRECTOR, and COMMISSIONERS. That, if he fail to execute his duty, the COMMISSIONERS may have power to disqualify him

him from obtaining in future, such an office, either for a certain period of time, or for life, as his offence is less or more injurious to society.

It is apprehended that such a check and control may sufficiently secure obedience to the regulations. The character of a medical man so entirely depends on the publick opinion of his good capacity and judicious conduct, that the apprehension of private reproof, and, much more, of a solemn censure, which must be generally known, would, in most cases, prevent a blameable neglect of duty. Besides, the families who would wish to appoint a temporary inspector, are in such a rank of life as in general would have the inclination, and the opportunity to prevent the communication of variolous infection.

II. *That the DIRECTOR diligently examine the registers and reviews of the INSPECTORS under his care. That if any*

any defect, or error occur, his advice be immediately communicated to the INSPECTOR. That, if the distemper spread, he be required to visit the infected families, and make an entry in a book kept for the purpose, what he judges to be the cause, with his opinion, what method is best adapted to prevent the calamity: that a copy of this entry be sent to the COMMISSIONERS as often as may be required. That he publish in the news-papers most commonly read in the neighbourhood, an abstract of all the registers in his CIRCUIT, mentioning the number infected and dead of the small-pox, in each DISTRICT, authenticated by the names of the INSPECTORS and DIRECTOR. That, where discovered, this report may mention the cause of the distemper spreading, or stopping. That, when the contagion spreads, a copy of the register be communicated to the COMMISSIONERS every month. That, in the CIRCUITS where its progress is successfully checked, a copy of it need only be sent quarterly, or yearly.

12. That

12. That the COMMISSIONERS give proper instructions in all difficult emergencies. That they issue from time to time, general orders and regulations. That they make regular reports of their proceedings to his MAJESTY in council, as often as may be required. That they publish every year, or quarter, or month, in the London and Edinburgh newspapers, the progress or suppression of the distemper.

13. That, if the contagion be generally propagated in any particular DISTRICT, or CIRCUIT, the COMMISSIONERS may appoint an occasional CENSOR, or CENSORS, of known experience and skill, to examine on the spot, and as far as possible, to correct the errors that have occasioned the mischief.

14. That the medical gentlemen have salaries adequate to their trouble, according to some fixed rule.

If the INSPECTOR have seventeen shillings, and six-pence and the DIRECTOR

PROPOSED OUTLINE OF A

TO R three shillings and six-pence for each militia-man his district contains, then the Inspector's salary would be £56, and the Director's £112 a year. And the publick expence of the establishment, by salaries to the Directors and Inspectors in England would be 32,000 guineas.

15, *That the salaries be paid from the country rates, or and the rewards for observing the rules of prevention, from the parish funds, or from*

16. *That the COMMISSIONERS, DIRECTORS and INSPECTORS be continued in office as long as they execute their duty attentively, faithfully, and successfully. That wherever the contagion spreads, the DIRECTOR and INSPECTOR of the district shall send to the COMMISSIONERS, if required, a certificate signed by the principal inhabitants, in what manner they have executed their duty.*

17. *That, on the requisition of the DIRECTOR and INSPECTOR of a CIRCUIT*

cuit and district, a power be given to two or more justices of peace to appoint a separate house for the reception of the patients in the small-pox.

Such a *pest house* has been, and would be of great publick utility, in preventing the propagation of infection, in certain circumstances; as, in situations where a few are infected, and a great number are liable to the distemper.

18. *That inoculation be generally encouraged through Great Britain. That, in large towns, inoculation, at stated periods must be performed, as already practised in Chester, Liverpool, Newcastle, Leeds, Dumfries, &c. That in small towns and villages, where the casual small-pox appears more seldom, little variation in the present method of proceeding need be required. That when the families of the more opulent are inoculated, the same benefit should be offered to all.*

What

What is commonly done through a principle of benevolence and humanity, the law might require to be universally performed.

19. *That at sea-port towns, an INSPECTOR of vessels be appointed, to examine whether any small-pox patients or infectious clothes had been on board each ship during her voyage, and, in that case, to take care that the rules of prevention are strictly observed.*

That this or another INSPECTOR keep an accurate account of sailors who have never had the small-pox; and that measures be taken to inoculate them, either in a hospital or in a ship provided for the purpose.*

20. *That inoculated patients be strictly required to observe the rules of prevention by the same penalties and punishments*

* See Dr. WATERHOUSE's letter, in the CORRESPONDENCE.

ments as are specified above (in the third clause). That the inoculator act as temporary INSPECTOR, and strictly perform the duties of that office as proposed (in the tenth clause) under the orders, and censures of the INSPECTOR, DIRECTOR, and COMMISSIONERS.

The danger of infection is much (perhaps thirty or fifty times) less in the inoculated than the casual small-pox: but yet a negligent observance of the rules might be productive of the greatest mischief.

§ II.

If we may assume, as proved in the INQUIRY, and confirmed by the SKETCH, that the *rules of prevention* are sufficient to extinguish the various contagion, wherever they are observed, the *practicability* of them can admit of no doubt. They require

Of the rewards and punishments.

K little

little trouble and no expence. To enforce them, nothing is wanting, but a thorough conviction of the fatal consequences of this contagion. For, as man has, by nature, an abhorrence to commit unprovoked injuries on his fellow creatures, he would dread the murder of them, by the communication of the small-pox, no less than by any other deadly poison. But, as we cannot expect to excite due attention, and to diffuse the necessary degree of knowledge amongst the poor and ignorant, pecuniary rewards must be offered, as the only persuasive to be relied on, for the faithful and effectual observance of the prescribed *rules*. And even to such rewards the strictest inspection must be superadded. For error and prejudice will long and forcibly operate against improvements, which require so many innovations in the domestick concerns and social intercourse of mankind.

A penalty

A penalty is proposed to enforce the law. By the act of parliament passed in 1746, to suppress the distemper among horned cattle, the fine for transgression was £10; by another, passed in 1757, it was £50: the same sums are proposed in these regulations. However, it will very seldom need to be inflicted. No citizen of Chester, and no stranger (except soldiers, * in *peculiar* circumstances) ever wilfully and perversely transgressed the *rules*, during the institution of the society.

§ III.

It must appear a very interesting question, on this subject, whether medical gentlemen would accept the offices above proposed. They would redound both to their honour and emolument. Their humane feelings would be highly gratified in being the means, under Providence, of fav-

Of the sala-
ries.

* See INQUIRY, p. 188.

PROPOSED OUTLINE OF A

ing the lives of a large proportion of the young generation. No class of men would be more disposed to assiduous exertion in accomplishing so important a purpose. It would be worth while to bestow much present care, for future ease and profit. There can be no situation where the present sedulous attention would more remarkably prevent future trouble. If *all* concerned, both officers and people, would perform their duty *exactly*, the small-pox might be exterminated out of the island in a few weeks! If *any* district observed the *rules* faithfully, the contagion would be proportionably extinguished. The comparative view of success would excite emulation, detect errors, and suggest their correction.

None of the proposed offices would be inconsistent with the ordinary duties of the profession.

By an examination of the *registers* and *entries*, it would clearly and quickly be

be discerned with what accuracy and success the duties of the *inspectors* and *directors* were executed.

It may be difficult to ascertain, with precision, what salaries would be adequate to the trouble of such offices. I have ventured however to put down a conjectural sum, in order to enable others to make a better estimate. The *inspector's* salary is proposed to be the least, because his care and trouble would be of the shortest duration. If the *inspector* exert himself properly, to *see* that the *rules* are exactly observed, and if the people under his care are truly solicitous to escape the distemper, the contagion might be extinguished in his *district* in a few weeks, and he will have no farther concern till it be again introduced from another *district*, when, with due care, it may again be exterminated in the same short period. The *director's* *circuit* would include the *districts* of several *inspectors*, and, while

the small-pox continues in any of them, his care and trouble must remain. It would also be more liable to return in proportion to the number of *districts* it contains. On these considerations, it seems reasonable that his salary should be greater than that of the *inspector's*. The *commissioners* will have the most constant, and long continued attention, not ceasing while the distemper remains in the kingdom; consequently their salary should be greatest.

The salaries ought to be such as to induce medical gentlemen of the greatest professional knowledge and assiduity to accept the offices, in order to support the establishment by their credit and influence.

By the proposed mode of raising the supplies for the salaries and rewards, it would evidently appear a common interest, and would tend to produce

an

an united exertion, to extinguish the contagion, as soon as possible, wherever it broke forth.

§ IV.

It seems clear that no mischief could possibly arise from the proposed regulations, but good exactly in proportion as they are executed. Let us suppose the worst event that can be imagined. *If* the small-pox were excluded from a place for ten, fifteen, twenty or more years; *if* then the contagion should be introduced; *if* the inhabitants should unanimously refuse inoculation; and *if* the distemper should attack all capable of infection, its fatal ravages would undoubtedly be dreadful. But, even, on this worst supposition possible, many lives would have been saved by excluding it, for so long a period, who would otherwise have perished in early infancy. However, such a calamity,

Inoculation would be increased.

in case the proposed plan were adopted, it is highly probable, cannot be justly apprehended. If the contagion should spread in any place, after being long excluded, inoculation would be eagerly and universally embraced by all ranks of people: it is no where generally practised, but in some of the southern counties of England, whence the casual distemper, for long intervals, is entirely excluded. If the regulations could be so perfectly executed as to extinguish the contagion, it is probable, that at some distant period, inoculation might cease to be general. But the more probable effect of such an establishment would be, to suppress the small-pox in some places, while it breaks out in others. These alarms would often excite the neighbourhood to embrace inoculation. So that, for many years, it would most probably increase this branch of practice, in a tenfold or greater proportion.

It will be objected, that however practicable it might be to exterminate the small-pox from a remote country, which has little intercourse with the rest of mankind, or from a nation who would obey the dictates of an absolute monarch, yet that these regulations could never be executed in such a *free* and *commercial* nation as Great Britain. The most satisfactory answer can be given to this objection, by referring the reader to a letter from Dr. WATERHOUSE inserted in the INQUIRY * and to others of the same learned professor, in the annexed CORRESPONDENCE. It will there appear that much more troublesome restrictions than here proposed are not injurious to the most perfect democratical liberty, nor in any respect impede the general intercourse of commerce.

* p. 138.

§ V.

Mortality by
the small-pox

I shall state a few observations to shew how fatal the small-pox has been in different towns in England. From these, we may form a conjecture how many inhabitants of the island are annually destroyed by this distemper, and hence estimate the importance of an establishment which has for its object the extermination of the pestilence.

In London, 1 in 9 and one sixth of all the deaths are by the small-pox. But this method of computing its degree of fatality, I apprehend, is delusive, and does not give an adequate representation of its destructive ravages. Nearly a *third* of the people who die in London, are emigrants from the country. The greatest part of such emigrants have had the small-pox before their removal. To compare the *births*, with the deaths by the small-pox,

pox, would be a much more accurate method of estimating the proportional mortality of this distemper, in London. Dr. PRICE observes that the medium of yearly births for ten years, from 1759 to 1768 was 15710. The annual average of deaths by the small-pox, during the same period, was 2506.* Hence it appears to be fatal to 1 in 6, and one fourth of all who are born in London.

In Manchester, the deaths by the small-pox for six years, from 1769 to 1774 inclusive, were 589; by all other diseases during the same period 3807. Hence 1 in $6\frac{1}{2}$ died of the small-pox.†

The late Dr. DOBSON favoured me with the following account of its fatality in Liverpool.

* See Baron DIMSDALE's Tracts on Inoculation.

† See Dr. PERCIVAL's Med. and Exp. Essays, vol. II. p. 69, edit. fourth.

Year.

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Year.	Burials.	Christenings.	Deaths by Small-Pox.
1772,	1085,	1160,	219.
1773,	1129,	1192,	200.
1774,	1420,	1207,	243.
	<hr/>	<hr/>	<hr/>
	3634	3559	662

During these three years, it appears that the numbers who died of the small-pox were in the proportion of 1 to $5\frac{1}{2}$ of all the burials, and more than 1 in $5\frac{1}{2}$ of all the christenings.

The great mortality of this distemper, in different situations, is a fact of the most striking importance. But to have a just notion of its destructive effects on the human race, and to what degree it obstructs population, we should recollect that it is chiefly fatal to infants. It will be evinced by the following table, that, in Chester, HALF as many die of the small-pox under ten years old as of all other diseases.

Children

Children under 10, from 1772 to 1777 inclusive.

	Under 1	1—2	2—3	3—5	5—10	Total.
Deaths by small-pox	91	75	83	86	34	369
All other diseases	392	155	68	68	53	736
	483	230	151	154	87	1105

Young infants are scarce susceptible of infection, so that none have died of this distemper under one month, and few under two months old. The disease most fatal to infants is convulsions, arising from various causes; one of them is the small-pox. These two circumstances will explain the reason why, under one year old, the proportion of deaths by the small-pox is less than in subsequent periods, not being quite as 1 to 4. In the second year, convulsions continue in a considerable degree fatal: the proportion between small-pox and other diseases, during this period, is as 1 to 2. Between 2 and 5 years old, the fatality of this distemper exceeds that by all other diseases

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eases in the proportion of 169 to 136, or, nearly as 5 to 4. Between 5 and 10, the proportion by the small-pox is less, because few natives of Chester, above seven years old, have not been exposed to the contagion.

In the year 1773, the inhabitants of Liverpool were enumerated to 34407, of Manchester to 29151, and of Chester to 14713. The annual average of deaths by the small-pox in Liverpool is 220, in Manchester 98, and in Chester 63. Hence the inhabitants of all these three towns together amount to 78271, and the annual deaths, on an average, by this distemper, to 381. *If* the inhabitants of Great Britain be estimated at 8,000,000, and *if* the small-pox were as fatal in other parts of the island as in these towns, the annual deaths in both kingdoms would amount to about 38941. These facts, it is true, are taken for too short periods; and from too few places to suggest an accurate

accurate estimate of the whole national mortality by this distemper. In Kent, Sussex, and perhaps other southern counties, the proportional deaths by this disease appear to be considerably less than the numbers here stated. But, in our part of the island, both in town and country, it nearly exerts its utmost mischief; as few or none escape the contagion till they are men or women.*

§ VI.

I requested the favour of my mathematical friend Mr. DAWSON to compute what would be the increase of population in Great Britain, at different future periods, if the small-pox could be exterminated; estimating the rate of mortality in this and other diseases according to the register kept at Chester for six years, 1772, 3, 4, 5, 6, and 7. I subjoin his calculation.

Population
might be
increased.

* See the Inquiry, p. 155, and the Introduction to the Sketch, p. 32.

‘Upon

PROPOSED OUTLINE OF A

Upon the supposition that among 8,000,000 of people, the mortality of the small-pox was in the same proportion as in Liverpool, Manchester, and Chester, there would annually die near 38,941 of this distemper. But, to make the calculation more easy, I have supposed 30,000, or 35,000 to enter annually at three years of age, and the decrements of life to be equal, the extent being eighty-six years. The reason of diminishing the number from 38941 to 30000 or 35000 is because a certain proportion of those who die of the small-pox before three years of age, would, if this distemper were exterminated, die of other diseases. The allowance, I am sensible, is too great, and the extent of life supposed, too short, upon both which accounts the numbers given below are less than they ought to be, but surely sufficient to shew our rulers the amazing importance of such a measure.

Period

Period of years.	Increase of inhabitants, if 30000 die.	Increase of inhabitants, if 35000 die.
10	281922	328909
20	527694	615643
30	737322	860209
40	910800	1062600
50	1048146	1222837
60	1149342	1340899

‘ These are large numbers, and yet, I
‘ am confident, considerably short of
‘ what they ought to be.’*

Political

* To appreciate the value of these calculations, it will be proper to consider how far Mr. DAWSON is qualified to make them. In the INQUIRY (p. 28.) I had occasion to refer the reader to his authority as a mathematician, and endeavoured to point out that it was highly respectable. But, as the partiality of friendship may be suspected to have had a share in my praise, it will not be thought superfluous to introduce the following character of Mr. DAWSON by Professor PLAYFAIR, a personal stranger, but an accomplished judge of his merit.

In his account of the life and writings of the late Dr. STEWART, professor of mathematicks in the university of Edinburgh, he mentions his celebrated attempt to determine the *Distance of the sun from the earth by the theory of gravity*. He observes that ‘ even among astronomers, it was not every one who could judge in a matter of such difficult discussion. Accordingly, it was not till about five years after the publication of the *Sun’s Distance*,
I. ‘ that

Political writers indulge various hypothetical notions concerning the cause of different degrees of population in different nations. But, in spite of all fanciful speculations to the contrary, I cannot but think that a measure which

' that there appeared a pamphlet under the title of *Four Propositions*, intended to point out certain errors in Dr. STEWART's investigation, which had given a result much greater than the truth. A dispute in geometry was matter of wonder to many, and perhaps of satisfaction to some, who envied that science the certainty of its conclusions.' — ' The problem to be resolved, is in its nature so complex, and involves the estimation of so many causes, that to avoid inextricable difficulties, it is necessary to reject some quantities, as being small in comparison of the rest, and to reason as if they had no existence.' — ' The author of the pamphlet, referred to above, was the first who remarked the dangerous nature of these simplifications, and who attempted to estimate the error to which they had given rise.' — ' It were doing great injustice to his remarks not to acknowledge, that, besides being just in the points already mentioned, they are every where ingenious, and written with much modesty and good temper. The author, who concealed his name, and permits it now, for the first time, to be publicly mentioned, was Mr. DAWSON a surgeon at Sedbergh in Yorkshire; a man, as it should seem, who might have enjoyed more of the fame, had he been less satisfied with the possession of knowledge.' Phil. Trans. Edinb. vol. I. p. 66.

would

would so remarkably increase the number of children to be added to society, must forward population in a great degree, and probably not less than Mr. DAWSON's calculation. Common sense, to which I would rather trust, than to any political theory, clearly makes this conclusion. Britain is in a rapid state of improvement. Such an increase of youth of both sexes could not be a hindrance but a help to her prosperity. The fear of numerous families deters men of high and middle rank from marriages; but, to these, inoculation already exerts its utmost mischief, in preserving their children from destruction by the small-pox.

In Zimmerman's Political Survey of Europe, it appears, that the number of inhabitants in each square mile of Great Britain is one hundred and five; of France is one hundred and fifty two; and of Holland two hundred and thirty-six. Why may not

PROPOSED OUTLINE OF

Britain become proportionally as populous as Holland? Our situation, soil, climate and extent of sea coast are nearly as favourable: our canals and navigable rivers are annually increasing: our political constitution is confessedly more excellent: our people are more ingenious and enterprising, though perhaps less industrious, and certainly much less sober and orderly than the Dutch. But the spirit of benevolence which so happily pervades the whole nation to improve the education of poor children, hitherto greatly neglected, will, we may hope, effectually reform their religious and moral principles, and, among other advantages, correct the habits of drunkenness and idleness in future generations.

I have long thought that the astonishing increase of population in America was owing, in a great measure, to the effectual care there taken to preserve the people from the ravages of the small

small-pox. It appears highly probable that the ancient was much more populous, than the modern world, in proportion, at least, to their means of subsistence: the difference seems plainly to have been occasioned by their total exemption from this destructive pestilence.

§ VII.

The expence of such an institution would be very trifling, compared with the advantages that might reasonably be expected from it. The salaries and rewards would probably amount but to a small fraction of the *interest* of the *extra* expences of a single year's war. Indeed, it is doubtful, whether such an establishment, instead of an expence, might not be a saving to the publick, even at its commencement, when the salaries and rewards would be greatest.

Charges
saved.

Exclusive of every medical expence, the charge of nursing patients in this distemper would amount to a very considerable sum. Thus, when a poor family is attacked by the small-pox, the parish allows two, three, four, five or shillings a week, for two, three, four or weeks. This sum is thought necessary to the poorest family. Nursing must be much more expensive to the middle and higher ranks of people. The charge of funerals by the small-pox should be added to this account. The expence of educating those children who die of the small-pox before they become useful to society, ought also to be taken into the estimate. This conclusion will be more clearly evinced by stating the particular articles.

The annual deaths by this distemper would amount to about 38941 as is above proved. But I will assume only 30,000 to make out the account. I find,

find, even in Chester, that about half who die of the small-pox are $2\frac{1}{4}$ years old: hence it must at least be fair, to suppose that they all die at two years of age. This number is considerably below the average, even in large towns; and several years below it, in small towns, and villages. It is therefore proper to estimate the charge of bearing, nursing, and burying 30000, who die before they become useful to society, being all of it lost to the publick.

Expence of lying-in, allowed by the parish *Annually.*
to the poorest woman, £1 - - - £30000

The parish allows 2s. a week to maintain a child, till he becomes six or seven years old.

This charge for two years is £10. 8s. each 312000

Funerals at 10s. each - - - - - 15000

If 1 in 5 die, the number who have the small-pox must be 150000. The charge of nursing these during the disease, at 5 s. each 37500
£39450

Every article of this estimate is manifestly much below the expence actu-

PROPOSED OUTLINE OF

ally incurred by the publick, and which would all be saved by exterminating the distemper. But, to form a just idea of the savings, we must recollect that the present annual loss by the small-pox of £394500 would be *perpetual*, or as long as the distemper continues: whereas the proposed *rewards*, would soon diminish and gradually cease; and after the contagion is extinguished, the salaries, which are only life annuities to men of middle age, would fall in by degrees; and, in that situation of affairs, the officers to be appointed to the vacancies might be less numerous and less expensive. I will not pretend to ascertain, with precision, what might be the sum required to support the proposed establishment. But no one will doubt that the *actual savings* would form an ample fund.

A considerable number of those who now die of the small-pox would die

die in childhood of other diseases, if this distemper were exterminated. But, in the estimate, much more than a sufficient allowance is made on this consideration. For, firstly, instead of 38941 I only reckon 30000. Secondly, instead of estimating the expence of two and a quarter years old, under which half the small-pox patients die, I omit the fourth of a year or ninth part of that important article. Thirdly, the rate of two shillings a week for nursing; of one pound for each birth; and of ten shillings for each funeral, are undoubtedly much below the average rates of these expences. Fourthly, I reckon 38941 deaths, in the proportion of eight millions of people in Britain. But it is highly probable that there are not less than nine or ten millions of inhabitants in the island. Consequently the deaths by the small-pox should be estimated proportionably higher.

§ VIII.

Plague ex-
terminated,

The idea of exterminating the small-pox has never, I believe, been seriously proposed to the publick, in this country, though every Englishman enjoys the uncontrouled liberty of making any proposal which he imagines may prove beneficial to the nation. There will be a preliminary difficulty in obtaining a patient and impartial attention to the important question. Such an untoward backwardness and prejudice to consider what is regarded as an impossibility, prevail in all ranks of society, that it will be no easy task to reconcile and familiarize us to so new an opinion, and to persuade us to wish and hope for its accomplishment. The analogy of other distempers, propagated by the like means, and extinguished by the same, or more difficult restrictions, might and ought to have some weight with the rational part of the

the community. The plague has been completely exterminated from this country, for above a century, by civil regulations. There seems to be little doubt that the small-pox is propagated on principles similar to the plague: and that it might be as certainly exterminated from the island. It has occasioned and does occasion incomparably greater destruction of the human race. These positions may require some proof and illustration.

1. The mode of propagating the plague and the casual small-pox is probably alike, namely, by breathing the contaminated atmosphere which surrounds the pestilential and the variolous poisons. In the *INQUIRY*, facts and arguments are fully stated to prove that the variolous infection is thus communicated. In regard to the plague, there has fortunately been no opportunity, in this country, of making observations on the mode of infection.

How com-
municated.

An

An opinion has lately prevailed that it is only communicated by contact of the patient or of the poison. But the quick propagation of this pestilence, by which many hundreds or thousands die in a week, within a single town, is a fact generally known, and conveys in my idea, the clearest and most convincing proof that the air which surrounds the poison is rendered infectious. It is probably contaminated by the breath and the perspiration of the patient, as well as by the *buboes* and carbuncles of the plague; for the poison thus generated is comparatively in much less quantity than is collected in the *pustules* of the small-pox. And though the contact of variolous matter, by the whole skin, will produce, as is well known, the inoculated distemper, yet all medical men will agree that such modes of inoculation are extremely rare, compared with the multitudes who receive the casual small-pox by the respiration of infectious air. As the

the visible and tangible matter of the plague is much less than of the small-pox, there is proportionably so much less chance of propagating the distemper by contact. The rapid progress of both distempers completely refutes these vague and fanciful notions, which have lately been maintained by very respectable physicians in France, Germany, Russia, and other parts of the continent of Europe.

2. Neither the contagion of the small-pox, nor of the plague contaminates the atmosphere in general, or indeed to any great distance from the poison. This circumstance has been well understood with respect to the plague. The terrors which attend its progress keep people at a distance, as much as possible, from the danger. And when, by some unforeseen accident, patients have been nearly approached without mischief, such instructive facts have been recorded with great

By near approach.

great accuracy, and authenticity. A numerous body of Franks live in Turkey and are uniformly preserved from the plague, by observing a few rules of *cleanliness* and *separation*, while the Turks die of it in multitudes around them. Innumerable facts of this kind prove, beyond all possibility of doubt, that the plague does not spread by any general contamination of the atmosphere. Dr. PATRICK RUSSEL, a very respectable physician, was in extensive practice at Aleppo for many years, particularly during the plague of 1760, 1761 and 1762, and visited patients, in all stages of the disease, at their own houses; he assured me that he administered medicines to great numbers ill of the plague every day out of a street window about fifteen feet above the ground, even in June and July: that, being short-sighted, he looked at the sores within four feet: that yet neither his family nor any inhabitant of the square where he lived were

were infected by the contagion of such a number of pestilential patients: and that it did not spread in a large house, if communication were prevented.*

A multitude of facts faithfully recorded in the INQUIRY and in the PROCEEDINGS of the small-pox society, clearly and fully confirmed by the decisive experiments of Dr. O-RYAN, prove, beyond all reasonable doubt, to what narrow limits the infection extends around the variolous poison, and how utterly groundless the opinion is, which has generally prevailed to the destruction of mankind, that the epidemical small-pox is propagated by some peculiar quality of the atmosphere which human wisdom can neither correct nor avoid. In a medical light, there is

* When this very sheet was in the press, Dr. RUSSEL's *Treatise on the PLAGUE* appeared. In this elaborate work, he has published the facts, which in a private and friendly manner, he communicated to me, several years ago. See p. 66, 67.

probably

probably little or no difference between the mode of propagating the plague and the casual small-pox ; and, clearly, there would be no greater difficulty in preventing one distemper than the other. What then can be the reason why one is excluded so completely from every civilized and enlightened nation in the world, and the other is suffered so generally to destroy a large proportion of mankind without a single effort to stop its propagation ?

comparative
Mortality.

3. The plague is a more fatal disease than the small-pox ; though its mortality exceeds that of the latter distemper in a much less degree than is commonly imagined. For the accurate Sydenham, who had opportunities to make observations on both distempers, asserts, that 'a species of the small-pox ' (in 1675) was not less fatal than the 'plague itself, in proportion to the 'number of patients infected, as far
as

‘as my judgment may be trusted.’* There is no reason to suspect that the species of small-pox in 1675 was more mortal than the Epidemicks which frequently destroy the poor children of the present generation, without exciting any alarm, and even without the knowledge of their more opulent neighbours. But the most malignant small-pox appears to be here compared with the mildest kind of plague. By the concurrent testimony of authors, the latter distemper, wherever it rages, is much more fatal than the former.

4. But the most important distinction between the plague and the small-pox consists in this circumstance: mankind are liable to the latter only once in their lives, whereas the former attacks the same person an unlimited number of times.

Repeatedly infectious.

* *Plures orco dabant, quam species alia quælibet (variolarum), quam mihi hactenus videre contigit; et, si quid meo judicio tribuendum sit, pestem ipsam, pro numero scilicet ægrorum, pernicie æquabant.* p. 236, S. V. C. iv.

Dr. RUSSEL informed me that he had known many undoubted instances, where the PLAGUE had attacked the same person twice ; in some, the second distemper succeeded the first so soon, that it appeared like a relapse ; in some, after the patient had been forty days recovered ; in some, at the distance of a season ; and in some, who had passed through the distemper in the last epidemick, twenty years ago. But he remarked that many cases did not occur, where the same person suffered a second seizure of the *plague*.*

* In his *Treatise on the Plague*, he has communicated the following curious and instructive observation. ' Of four thousand and four hundred pestilential cases, I met with only twenty-eight of re-infection, well ascertained. I had occasion to see none myself who suffered more than two attacks ; but have been credibly informed of persons having suffered three, and even four. The twenty-eight cases, above-mentioned, are to be understood with a restriction to persons who had suffered the plague before, sometime in the period commencing in 1760,' namely, during the same epidemick.— ' Of the proportion, of those who suffered the disease in 1742, and were now again infected, I can say nothing, with certainty, but conjecture it to have been very inconsiderable.' p. 190. The chance of re-infection hence appears to be only 1 in 157. The

The small-pox is generally a disease of infancy: the patients are usually unconscious of the danger and the sufferings which await them. From the PLAGUE, none can feel security. Every individual is in danger. The terrore and alarm are universal. All ranks and ages fly from the tremendous calamity. We feel less, much less anxiety for the safety of our children, than of ourselves.

5. Though the PLAGUE is the most mortal disorder to which humanity is liable, though its visitations are attended with the most destructive havock, yet we may be convinced, by comparing the history of their progress, that the small-pox has been fatal to infinitely greater numbers of mankind. The PLAGUE has probably existed from remote antiquity, and, at times, has excited a general alarm, among civilized nations, but its ravages have been temporary and partial. Whereas,

But destroys
much fewer
people.

M 2. the

the small-pox has universally, with very few exceptions, and constantly, for above a thousand years, spread destruction over the whole habitable world. During this period, we cannot form a probable computation of their comparative devastations, but we may reasonably conjecture that the past and present mortality by the small-pox is *many thousand degrees* greater, than by the PLAGUE.

On what principle of reason, or of humanity do we nourish and protect the most fatal enemy of mankind ? We are astonished at the folly and the superstition of the Turks, whose principles of predestination foster the PLAGUE among them, though the cause of so much misery and mortality. Yet, with equal indifference, and, nearly equal absurdity, we nourish among us a dis-temper which destroys a seventh, or eighth portion of our offspring. The Turks might be taught wisdom by the

Franks,

Franks, who preserve themselves from infection, by very easy rules, and by the successful laws of all the civilized nations of Europe. The general diffusion of the small-pox affords a popular prejudice that no civil regulations can controul its progress. But authentick proofs of its extermination from Rhode Island, New England, St. Helena, &c. being produced, no great effort of wisdom is required to conclude, that, by the like methods, it might be exterminated from Great Britain.

If a gazette announce the ravages of the PLAGUE among the barbarians of Asia or of Africa, all Europe trembles. Yet Europe nourishes, in every part of it, a distemper, which for many centuries has been incomparably more mortal, and which might, by the same or easier methods, be utterly extirpated. The *rules of prevention*, which on this occasion I shall take for granted to be

M 3 adequate

adequate to the important purpose, would prove more practicable, beyond all comparison, and less interrupt or derange the habits of society, and of commercial intercourse, than the laws of quarantine.

§ IX.

Murrain ex-
terminated.

It is highly probable, that the *murrain*, or the distemper among the horned cattle, like the plague and the small-pox, is communicated through the medium of air. It has been several times successfully exterminated from Great Britain ; a fact which certainly enables us to infer, by analogy, that proper measures would, in like manner, extinguish the variolous infection. The *murrain* appeared in Italy* in 1514 and again in 1711, when it spread through Germany, France, Flanders, and in

* Bern. Ramazzini opera. *De contagiosa epidemia boum.* p. 459.

July 1714 appeared in England. In Middlesex, Essex and Surrey, it destroyed five thousand five hundred and eighteen cows, and four hundred and thirty-nine calves. It raged with great fatality for three months ; but, by the wise measures of government, its progress was soon checked, and the distemper perfectly exterminated before Christmas*. In many parts of the continent of Europe it continued to rage for several years.

The *murrain* was again brought from Holland into Great Britain in 1745, † and continued its destructive ravages, in this island, for full twelve years, being not exterminated till 1757. The long continuance of this mischief partly proceeded from the confusion of the nation at that time, harrassed by a foreign war, and by an internal rebellion. The rewards offered by govern-

* See Phil. Trans. No. 358.

† Phil. Trans. tom. XII. p. 922.

ment, for observing the prescribed rules, were too small to secure strict and faithful obedience. As an inducement to kill the cattle, on the first symptom of infection, only *half* the value was allowed to a poor farmer, not exceeding forty shillings for a cow, and ten shillings for a calf. To shew the general sense of the nation, that this premium was inadequate to the end proposed, several associations were formed in different parts of the kingdom to increase it. Thus at Beverley in Yorkshire, April 6, 1748, landlords agreed to allow ten shillings to their tenants at the rate of twenty shillings given by the king, for distempered cattle, properly slaughtered. We may form some conjecture of the mischief produced by this distemper from the sum total* of the publick rewards, though

* The expence of rewards, for slaughtering distempered cattle, in different years.

Year.	Sum.
1746	£12948
1747	30000

1748

though estimated at so low a rate, and so partially distributed.

As only half the value was allowed to a poor tenant, and nothing to persons in better circumstances, the chance of recovering their cattle would tempt many to defer killing the distempered at all, or till they had generated and communicated the infection. If the publick had allowed the full value for cattle properly slaughtered, as soon as infected, and the other regulations had been punctually executed, the MURRAIN might have been exterminated

Year.	Sum.
1748	£62000
1749	7400
1750	13370
1751	23904
1752	4000
1753	5700
1754	5200
1755	4200
1756	500
1757	500
Total	<hr/> 169722

from

PROPOSED OUTLINE OF

from the whole island in a few months; the total expence of rewards would have been greatly diminished; and the national losses and calamities, might have been, in a very great degree, prevented.

The MURRAIN was brought into Hampshire in 1769; it soon afterwards appeared in Scotland; and, since that time, twice in Essex and once in Suffolk.* In all these instances, the infection was immediately and perfectly extinguished. Encouraged and instructed by the example of England, the MURRAIN has been exterminated from France, by an imitation of the measures which had proved successful in this country. But in spite of the fortunate and happy exemption of this island from the calamity, and though the regulations by which it was obtained are perfectly understood, yet it

* See Phil. Trans. vol. LXX. § xxxi.

is allowed to continue its devastations in several parts of the continent of Europe, even so near to us as Holland.

A letter in the Gentleman's Magazine, dated Rotterdam 1769, Dec. 17th, exhibits an exact statement of the cattle which died of the MURRAIN in South and North Holland, in five months, namely, from April to August inclusive, according to the retuns which were made to the magistrates.

Alive in April 1769.	Sick.	Died.	Recovered.	In health.
60,326	29,255	21,083	5368	31071. S. Holl.
41,664	19288	11824	5037	22376. N. Holl.
101990	48543	32907	10405	54447. Total.

A premium of ten thousand gilders was offered by the states general, to any person, who would discover a remedy. The writer adds justly and pathetically, to his English correspondent. ‘ You may learn from this true representation, how happy your island is

‘ to

PROPOSED OUTLINE OF

‘ to be so far separated from the infection, as not to be within its reach. ‘ The misery it has occasioned here is ‘ not to be expressed, and, if it should ‘ please God to continue this severe ‘ visitation much longer, an universal ‘ bankruptcy must ensue.’ *

That they should not profit by our wise and salutary laws, corroborated by the most authentick facts, appears astonishing and unaccountable. As the distemper still rages so near us, in spite of this evidence, what would have been the consequence, if the contagion in Great Britain, which withstood our anxious exertions for twelve years, had finally proved victorious? If such had been the event, there is a high degree of probability, that the MURRAIN would have continued unconquered through Europe, and would have been submitted to for ever, like the small-

* See Gent. Mag. for 1770, p. 26.

pox,

pox, as one of the inevitable evils of nature. We happily improved the peculiar advantages of our insular situation and free constitution. By the complete and frequent extinctions of this pestilence, we have given an instructive and beneficent lesson to Europe, and all other civilized nations. We have clearly refuted, by the most unquestionable proofs, the dangerous doctrine which then generally prevailed, that the distemper originated from bad seasons, and bad food, but not from infection. Had this doctrine become established in Great Britain, and had we submitted to the evil as inevitable, in the same manner as we now submit to the small-pox, we cannot doubt that the MURRAIN would have become a perpetual calamity.

Let us employ the inestimable privileges of our situation, for the general benefit of mankind. Were it possible to excite the spirit of the English nation,

PROPOSED OUTLINE OF

tion, to the glorious and humane ambition of extinguishing the small-pox, the business would soon be successfully accomplished. What blessings and comforts would result to mankind not only in Great Britain; but in all the surrounding nations ! Instead of being regarded with enmity by our neighbours, we should become the most deserving object of their love, gratitude and admiration. No triumph could render the national character so illustrious as a complete victory over the small-pox. We need not despair of exciting an enthusiasm among the people, in a cause which leads so directly to true glory and real greatness. Difficulties undoubtedly would arise, but such as ought to excite, not discourage, our exertions. We have overcome difficulties incomparably greater, in a much less meritorious cause.

§ X.

This SKETCH having been extensively circulated among my friends and acquaintance, for the benefit of their objections, and hints of improvement, a very ingenious correspondent* expresses his apprehensions, that such an establishment as is here proposed, might be dangerous to English liberty. When I first read this objection, it extremely shocked and surprised me; nothing being farther from my mind than to propose any measure that could eventually invade the invaluable privileges of Englishmen. Though I entertain a very sanguine and ardent wish to preserve the lives of my countrymen, yet I still much more anxiously hope that they may continue to enjoy, without the slightest infringement, the blessings of liberty. No consideration

The propo-
sed establish-
ment not
dangerous to
liberty.

* The late Dr. John Jebb.

on earth should induce me to propose regulations in the remotest degree unfriendly to freedom.

The power of the magistrate can only enforce punishments directed, by the law, upon delinquents, in circumstances of criminality against the lives of their fellow-creatures, that will be warranted by the opinion of the more discerning and more respectable parts of the community. The **COMMISSIONERS, DIRECTORS and INSPECTORS** could not have the remotest inducement to abuse their official power, for professional purposes. Their practice, as physicians, surgeons and apothecaries entirely depends on the good opinion of their neighbours, which could not be improved by oppression, connivance, or any other impropriety of behaviour. The visits of the **INSPECTORS**, in Chester, were always welcome and agreeable to their fellow-citizens. They offered and bestowed money. What dangerous

gerous invasion of liberty can be apprehended by the sick family, from the visits of their old neighbour and benefactor, the apothecary of serious and civil demeanour? Will mischief be suspected from the hand which has so often given consolation in the hour of distress? The INSPECTOR's duty is not that of a *spy* to detect fraudulent gain, but of a friendly monitor to warn the ignorant how to avoid poisoning their neighbours and friends. The inhabitants of every town entertain a good opinion of their physicians and surgeons, or would soon invite others to supply their place. The medical connection is perfectly free, and solely depends on good opinion. The natural influence and authority of character, I believe, would, in general, render the exertion of power unnecessary. Party speeches and pamphlets might conjure up some frightful demon of arbitrary power; but I am confident, that the people, who receive rewards

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would

would neither feel nor fear any injurious infringement of their liberty.

In regard to the families of the middle and higher ranks some accommodation might be desired, which it would not be difficult to adjust. Those who can afford to employ an apothecary of their own, might not be pleased with the visits of an alien. This might be an unpleasant circumstance, for which a remedy is proposed in the regulations.

So far from endangering our liberties, the appointment to such offices is ordered in such a manner, as not to have any political influence whatsoever. The DIRECTORS and INSPECTORS could not be removed, but for an unfaithful execution of their duty. A ministerial mandate could neither deprive the attentive, nor protect the careless officer. There is no danger that the proposed moderate salaries would render them independent.

independent. They must act, in these offices, so as fully to merit the approbation of their neighbours and patients.

Some of my correspondents have hinted that the small-pox might be extirpated more successfully from an arbitrary than from a free government. But I am disposed to think that an act of the British legislature would be more faithfully executed than any arbitrary edict whatsoever. Such a law could not be obtained, unless approved by the most respectable men in the kingdom, who would become active and powerful friends to the establishment. The distemper among the horned cattle still exerts its destructive ravages in many of the absolute monarchies of Europe. Even the plague itself remains uncontroled in the most despotic government upon earth.

Some discretionary power may be allowed with safety and advantage to

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the COMMISSIONERS, in regard to giving instructions to the DIRECTORS, and INSPECTORS how to execute their offices, as to the frequency of visits, the mode of keeping *registers, reviews, remarks, &c.* The experience of private societies might nearly point out all the regulations of this kind; but general observations would detect and correct many imperfections. These instructions could convey no power which the act of parliament did not explicitly define and describe.

§ XI.

Advantages
of a publick
establish-
ment.

From the degree of success which attended the regulations of our private society at Chester, as faithfully recorded in the INQUIRY, and the PROCEEDINGS, I have the firmest persuasion that a *publick establishment*, on the same principles, would effectually exterminate the casual small-pox from this island.

island. To explain the foundation of my confidence, it may be satisfactory to consider the numerous and important advantages that would be enjoyed by a publick, in comparison of our private institution. No one, who duly weighs the following considerations, will deem these expectations too sanguine.

1. Our INSPECTORS at Chester were only the apprentices of apothecaries, who could not be expected to execute the important and difficult office with due accuracy and discretion. But when a surgeon or apothecary of considerable practice, knowledge and reputation, accepts the employment, his personal influence and authority will have the most beneficial effects. His professional character will give great weight to all his directions and injunctions. His own reputation, in the success of his charge, which will be held up to publick notice, by daily conversation, and by monthly or publications, will

N 3 secure

secure his constant and unwearied exertions to accomplish the object of his office. And, though an anxiety to acquire reputation and a good name is the first consideration and motive with most medical men, and perhaps to a greater degree, than in any other profession, yet to reward a faithful and successful execution of the most important publick services, the emoluments ought to be such as to deserve his consideration. It should be an object of *profit* to medical practitioners of the highest reputation,

2. In Chester, the full reward to a poor family, for observing the *rules of prevention*, was ten shillings on the first institution of the society, but it was soon diminished to five shillings, from an apprehension lest the voluntary contributions might be inadequate to the expence which would be incurred, if the distemper should generally spread among our fellow-citizens. However,

to

to secure the perfect obedience of the poor people, the publick rewards ought to be considerably greater. It should be a prize worth their anxious attention. The reward ought to be varied according to the number of days that would be required to watch the poison, in each house. A probable estimate of this period may be formed from the one hundred and eighty-four facts recorded in the INQUIRY;* where the number of days, between the commencement of the variolous fever and the time when the last scab drops off, all the patients in the family, are accurately noted. The shortest period is ten, and the longest sixty-three days. The proposed reward of six-pence or a shilling a day may be nearly an adequate sum, in common cases, to be varied according to the difficulty and the importance of different circumstances.

* P. 54.

3. In the PROCEEDINGS of our private society, it is recorded, that the small-pox was brought into Chester from towns at a great distance.* By the constant intercourse with our near neighbours, who were suffered to disperse the poison without any warning or suspicion of the fatal mischief, numerous instances undoubtedly occurred, where the infection was conveyed into the city by various unperceived, and unsuspected means, from the adjoining towns and villages. If preventive measures were generally established ; the regulations, being every where known, would universally operate. None would spread the poison through ignorance ; few would wish and still fewer would dare, to transgress the rules through motives of mischief or malice. Such conduct would imply more than savage cruelty, and barbarity. If a watchful inspection were established throughout

* See p. 190. 203.

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the whole island, the trouble and the danger in each district would be diminished, in such a degree, as to astonish the nation, and would inspire such general confidence as to secure the most perfect success.

4. In Chester, the lower class of people have no fear of the casual small-pox. Many more examples occurred of their wishes and endeavours to catch the infection, than to avoid it. This absurd and unaccountable prejudice was the principal difficulty which we experienced. If a contrary spirit had prevailed, our regulations would have been observed with incomparably greater strictness and success. This prejudice, however irrational and pernicious, is not, I fear, peculiar to Chester. It probably prevails in other towns, especially in those which are so large as perpetually to nourish the distemper, by so quick a succession of infants as constantly to supply fresh subjects for infection.

But

But in small towns and villages, especially where placed in remote situations, the young generation grow up to have a consciousness of the danger, before they are attacked by this dreadful pestilence: the preventive regulations, in such districts, would be generally and cordially seconded by the wishes and the anxieties of the people. In these circumstances, there is the greatest reason to hope that the propagation of the distemper would be prevented, with such marked success, as to produce a general conviction of its practicability, and of its advantages to mankind.

If the *rules of prevention* be sufficient to stop the pestilence wherever they are faithfully executed, and if their execution were supported by a publick establishment, the small-pox would be so completely extirpated, from such large districts, and for so long a period of time, as to impress full conviction on the most

most sceptical unbeliever. The methods of securing these benefits, in particular districts, being circumstantially detailed and publickly authenticated, great force and facility would be added to the regulations for exterminating the contagion from larger towns. The comforts that would be felt and expressed, by truly affectionate parents, in the districts where the rising generation were preserved from all danger of infection, would soon communicate the like wishes and hopes to other places, which had not yet obtained the blessings of so happy a security.

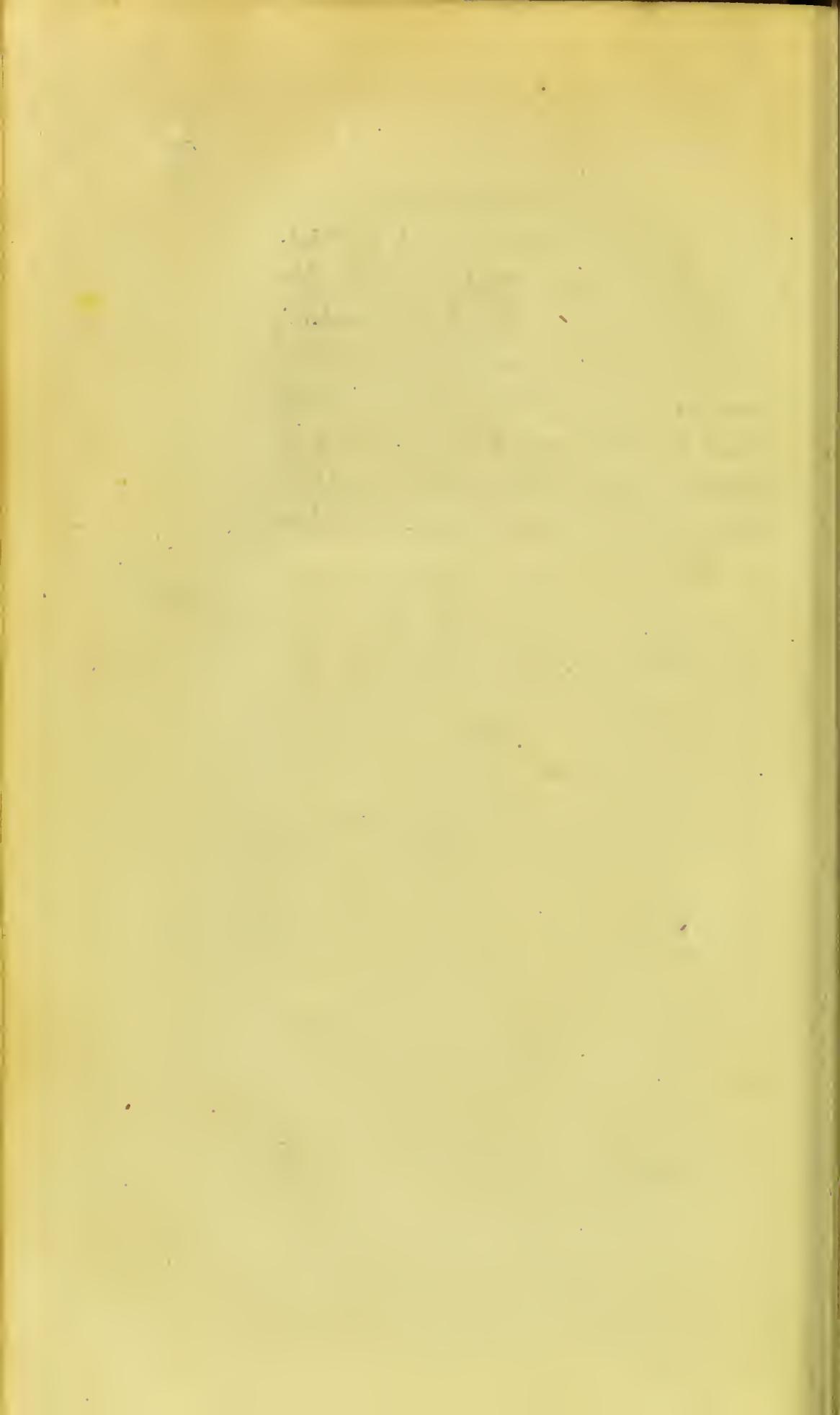
As the *infectious atmosphere* seldom extends to half a yard and never to many yards from the poison, it may as certainly, in a medical view, be prevented from spreading in a neighbourhood where the houses are placed close to each other, as where they are situated at the distance of a mile. When facts prove, in certain places, of considerable extent,

extent, that the observance of a few easy regulations will certainly secure society from the visitation of so dreadful a pestilence, a general and very just censure will follow every wilful or wanton transgression of the rules. When the *publick voice* unites, and gives vigour to the laws, every eye and every tongue would aid and assist their accomplishment.

In this happy land of freedom, we may, without controul, speak and write whatever the head, or the heart suggests for the good of our country. If a glorious spirit of patriotism and philanthropy should inspire Great Britain, on this, as it has often done on less important occasions, I have not the shadow of a doubt that the casual small-pox would be soon and perfectly exterminated from the island. I am well aware that there are many medical and a whole host of vulgar prejudices to encounter; but when the subject shall come

come to a fair discussion, the voice of reason and of humanity will prevail. When the question shall be fully debated, the good sense of the nation will clearly discern truth from errors, however specious and inveterate. These medical errors have held mankind in shameful delusion and destructive subjection, because their dominion has never been disputed.

A COR-



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CORRESPONDENCE

ON

VARIOLOUS INFECTION

WITH

Mr. DAWSON;

Dr. AIKIN;

Professor IRVINE;

Dr. PERCIVAL;

Professor WALL;

Professor WATERHOUSE;

Mr. HENRY;

Dr. CLARK;

Dr. ODIER.

ET REFELLERE SINE PERTINACIA, ET REFELLI
SINE IRACUNDIA PARATI SUMUS.

Cic. Tusc. Disp. II. 2.

CORRESPONDENCE.*

I. EXTRACT of a LETTER from Mr. DAWSON,
Surgeon, at Sedbergh, in Yorkshire; dated
1780, July 8th.

‘ About two years ago, a case happened in this town, nearly similar to that mentioned in the printed paper, which you have sent me.†

‘ A young man came from a distance with a fever upon him. It proved to be the small-pox and of the confluent

* A full explanation of the foundation and purpose of this CORRESPONDENCE is given above, p. 60—77. The reader is particularly desired to keep it in his recollection, during the perusal of all the following letters.

† See the INQUIRY, p. 104.

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kind ; of which he died on the twenty-eighth or twenty-ninth day. He lodged in Fincle-street, which cannot be more than three yards broad. He lay up one pair of stairs ; but at the head of them, where there was no door. The foot of the stairs is close to the door, which opens into the street. The house where he was, being exceeding small, and he a very lusty young man, there was not a particle of air in any of the rooms, but what was impregnated with the contagion, as might be discovered by the smell. Upon going into the house, the offensive stench struck one immediately ; and as the door is a bad one, I am pretty confident might have been perceived, before it was opened.

‘ No particular precautions were used by the uninfected, except by keeping out of the house. The nurses were desired to wash the dirty clothes, and to convey away all discharges, &c. from the patient, at proper hours.

‘ The

• The small-pox had not been epidemical at Sedbergh for upwards of seven years. Some of the next neighbours had not had the distemper, nor great numbers of children, who passed through the streets every day: yet not one caught the infection.'

II. 1. *A LETTER from JOHN AIKIN,*
M. D.

MY DEAR FRIEND,

• You may ever be assured that whatever is interesting to you, will command my willing and cheerful attention; and I therefore most readily re-assume the consideration of your opinions on the small-pox, and congratulate you on that respectable testimony* to their importance which has revived your ardour on the subject.

* By the French and German Translations of the Inquiry how to prevent the Small-Pox.

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‘ I must begin with confessing that my own knowledge and observation qualify me to say very little to the purpose; for though I have been witness to many instances of epidemical small-pox, the sources of infection were generally so numerous; and the curiosity of the poor, who were its chief victims, was so little excited, that I have no certain facts to communicate concerning its contagion. All I can say, is, that from the observation of my own family and a few more, I have no doubt of the possibility of guarding against the contagion with tolerable care; nor do I personally know of any instance in which the disease has been communicated by an intermediate person who had only visited in the sick chamber. For my own part, I never used any other precaution than exposing myself to a good ventilation after a visit; but this I scarcely ever neglected. Further, I am from repeated observation fully convinced that the spread of the

the small-pox does not depend upon any particular state of the air, but upon the numbers in every place liable to the infection, provided it be once sufficiently established.

‘ So far for fact and experience. What follows is all from argumentation.

‘ You may remember that I was never thoroughly satisfied with your theory of the solution of variolous miasma in the air, and the conclusions you deduce from it. I see clearly the importance of this doctrine in laying down rules of prevention ; but in a practical matter of so much consequence, I think it too hazardous to build upon a foundation of theory, unless perfectly demonstrated. I have just been reading over the chemical part of your Inquiry, along with my intelligent friend Mr. Morgan, whom I consider as deep in chemical knowledge ; and he is still

less convinced than myself with your reasoning on this head. He looks upon the test of transparency, as altogether inapplicable to particles of such extreme tenuity; and he thinks that even admitting the probability of the *solution* of these particles in air, the power of the air as a menstruum would be greatly affected by various circumstances, such as heat, moisture, and the like, which would much impair your conclusions. The doctrine of affinities is known to admit of many exceptions from these causes, so that, in certain circumstances, a body shall frequently take from another a third with which it has on the whole less alliance. Then to come to analogy, we cannot but think that the facts in opposition to your doctrine, which you so fairly state, (p. 69.) are really, upon the whole, decisive against you. Thus, the remark in p. 71, concerning clothes acquiring the smell of tobacco, is certainly not answered by *supposing* that some

some smoke (after a whole night) might remain in a diffused state; or that the person might get some foot upon him, which foot, you will observe, results from a decomposition of the tobacco, and therefore probably would not smell like it. In the case of woollen clothes becoming damp in a moist air, it is certain that they will do so in air which *to the sight* does not shew diffusion of the watery particles. Mr. Howard's observation seems point blank against your opinion; for supposing a room equally supersaturated by variolous particles, why might they not be equally deposited upon clothes, papers, &c. The fact of clothes tainted by a privy, is equally to the purpose; for I am certain that this happens where nothing more *visible* arises from thence, than from a small-pox patient. With respect to musk, it is also surely not sufficient to say that its effluvia are possibly different from all others; for it is an animal substance; and at any rate its effluvia are

O 4 *invisible,*

invisible, and yet taint clothes. It seems to me merely that the impregnation is here more perceptible on account of its stronger odour. On the whole, these analogies strike me so strongly, that I should scarcely doubt that the *bed-curtains* of a small-pox patient, who had the disease *severely*, though not actually tainted with the matter, would yet imbibe miasmata sufficient to infect a person to whom they were *directly* taken without ventilation. And if this *extreme* case be true, it will follow that the danger of infection from clothes in *all others* will be in a ratio of the degree of original impregnation, and subsequent ventilation; and that no absolute line can be drawn, though, I think, rules sufficient for practice might be devised. To be perfectly explicit, then, as to your main question, respecting the sufficiency of the preventive rules, I shall go a step further than your medical correspondent in p. 81, and say, "that *as the theory*
that

that contagion cannot be conveyed by clothes, &c. of attendants, appears to me not clearly established, I think the rules defective in so much as they do not provide for such a possibility." What it would be necessary to add to them, I am unable to determine; but I suppose that "if it were forbidden to make common use of any clothes, linen, &c. which had remained in the small-pox chamber, till they had been hung some time in the open air; and also that any attendant on a small-pox patient should mix with uninfected persons without first continuing in the air some time proportionable to the length of his stay with the former—all would be enjoined that safety requires." And, in fact, so much I believe is done by all who mean to avoid conveying the disease. I allow that where rules are laid down so indeterminately, and with such latitude, it is impossible by rewards or penalties to secure their observance. But, after all, unless the bulk of the people are hearty in their wishes

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to prevent this evil, what can be done effectual?

‘ Now, my dear friend, having read my full opinion upon the main point of your Inquiry, and seen also how far my observation of facts extends, you will judge in what manner it is to be used. I am perfectly ready, if you choose it, to say in publick all I have said to you in private; and I shall be truly happy if it will tend upon the whole to forward your benevolent designs. I cannot see any impropriety in your obtaining the equally avowed sentiments of a number of your correspondents. But if I may be allowed to anticipate their probable answers from what I discover in conversation, I believe you will find that few will encourage an implicit reliance on your chemical theories, but all will lay great stress on the *facts* you have established.

J. AIKIN.’

YARMOUTH, Nov. 30, 1786.

2. ANSWER to Dr. AIKIN'S LETTER,
dated February 7, 1787.

MY DEAR FRIEND,

I highly esteem, as I ever did, both the frankness and the candour with which you express your opinion. Being neither too acquiescent, nor too disputatious, I love your manly honesty, which tells the whole truth, and nothing but the truth.

I still possess clear conviction, that the theory which I have ventured to advance concerning the solution of various miasms in air, is true, and important. As you allow the latter, you will excuse my solicitude to maintain the former position. On a practical subject of so much consequence, you require perfect demonstration. I am satisfied that the facts stated in the INQUIRY, p. 17—24 and 68, on which

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the theory depends, are proved with *intuitive certainty*. The argument is deduced from the clear evidence of our senses, and on principles demonstrated to be true, by the best chemists. The doctrine of elective attraction, on which this theory is founded, is established upon as clear principles as any branch of natural philosophy. In order to invalidate the conclusion, you have recourse to arguments merely hypothetical: that there *may* be more moisture or heat in one case than another: which *may* produce a double elective attraction. Heat might be suspected, with most reason, to promote infection; but the open air,* even at a cold season,† was quickly rendered infectious by a passing patient. Besides, you know, from repeated observations, that the small-pox spreads at all seasons, hot, cold, moist, or dry: it has not yet been determined in what temperature of the

* p. 32.

† p. 97.

air

air this distemper is propagated with greatest rapidity. By such plain facts, this conjectural objection appears to be clearly refuted.

Again, both you and your ingenious friend suppose the infectious particles of such extreme tenuity, that the test of transparency is altogether inapplicable to them. This kind of expression is rather adapted to a vague manner of philosophising, than to chemical precision. Our most certain knowledge of the particles of this poison is as it exists in *pus*, a substance no way remarkable for either the tenuity or transparency of its particles. When united with air, this and many other odours become invisible, not from the tenuity of their particles, but because they are *dissolved*. When gold is dissolved in aqua regia, you might allege, with equal reason, that its particles were invisible because of their tenuity; though gold is the most tenacious, the heaviest and

and grossest substance in nature. On the contrary, if two kinds of air be diffused together, they are visible; as, fixed, and atmospherical air; till united by solution; yet air has the most perfect transparency and greatest tenuity of any substance we know.

You appear positive that woollen clothes become damp in air, which, *to the sight*, does not shew diffusion of watery particles. My observations lead to a contrary conclusion. When the sun, not far elevated above the horizon, shines partially on the edges of a divided cloud; its beams, thus reflected, are generally, if not always, visible; this being, as you must often have remarked, a very common phenomenon. The small floating particles of water, &c. diffused in the atmosphere, are gilded bright, and form a strong contrast to the dark shade behind them; exactly in like manner, as the particles of dust are seen, when a ray of the sun is

is admitted into a darkened chamber. Yet in these very circumstances, the miasms arising from a small-pox patient are invisible. This fact is fully stated in the INQUIRY ;* and, since its publication, it has been confirmed to me, by the clearest and most satisfactory inspection, in a chamber where the particles of dust were distinctly seen, in a sun's ray ; but, at the same time, and in the same place, no emanation from the matured pustules and scabs could possibly be distinguished. Yet you cannot entertain a single doubt, that a person, liable to the small-pox, would receive the variolous infection, by breathing the air impregnated with the poisonous exhalation of the pustules. The poison, therefore, exists in this air, and is invisible ; consequently, is united to it ; by *solution*.

You say that analogy is decisively against my opinion, as appears from

* p. 21, 22.

the

the objectionable facts which I have stated. By these words, you seem to assert that neither water nor odours can be contained in air without becoming visible; but, on a moment's recollection, you will not maintain such an opinion. If air contain water and odours in an invisible form, it must be by solution, and in a manner perfectly analogous to the mode of combination between air and variolous miasms. I have endeavoured to prove, and I hope with success, that the doubtful cases are not even exceptions to the law on which my argument rests. In every instance, except that of musk, I apprehend, that I have produced positive or very strong presumptive evidence, that the adhesion of moisture and odours to clothes proceeds from their having supersaturated the air. But, if you should not be satisfied with this explanation, you will scarcely maintain that a few exceptions out-weigh the *general law* of nature, supported by thousands of facts.

facts. Did you ever perceive, or have you heard others declare, that the clothes which are exposed to the miasms of a small-pox patient acquire a variolous smell?

That a chamber, occupied over night by a company of smokers, retains not only the smell but the visible vapour of tobacco, is not a mere supposition. I have actually seen it in the specified circumstances.

It is just possible to suppose that the bed curtains of a patient ill of the very malignant small-pox might communicate infection ; if the curtains were made of thick stuff, and formed into twenty or an hundred folds, and a person liable to the distemper were to draw his breath *through* them. Several facts are recorded in the INQUIRY which clearly prove that a dilute impregnation of the variolous poison in air will not produce the small-pox. Thus,* a person, sus-

* p. 107.

ceptible of infection, went every day into a little chamber, which contained a small-pox patient, till the thirteenth day of the disease, and was not infected: though for the last five of these days, that is, from the eighth to the thirteenth of the disease, you cannot doubt that the air of the chamber was impregnated to a considerable degree, with the poison. There can be no reasonable doubt that she was susceptible of the distemper at this time, as it commenced on the seventeenth day after separation, on her being exposed to sufficient infection. The INQUIRY contains many other facts, which prove, that a slight impregnation of air with the variolous poison is not capable of propagating the distemper. On these data, we are warranted to doubt whether the 'contaminated curtain,' the extremest case which your imagination can suggest, would contain as much variolous poison as could communicate an infectious quality to the air of an adjoining chamber.

ber, if conveyed into it with all possible care. It can hardly be supposed capable of throwing off as many variolous miasms, as a small-pox patient between the eighth and thirteenth day of the disease. If the curtain were to be carried into a more distant chamber, part of its poison would necessarily be diminished, both by pressing out some of the infectious air contained in the pores of the cloth, and by exposure to fresh air. Your extremest case, on a fair investigation, appears to threaten very little mischief. You will allow, that there is incomparably less cause to apprehend that the clothes of a visitor will be rendered infectious, as they remain but a short time in the patient's chamber, so that little of the contaminated air can be suspected to enter their pores; besides, these clothes are immediately exposed to the fresh air, which, in half a minute, must dissolve every infectious miasm.

This reasoning is not founded on vague conjecture, but on facts; for their proof, I refer you again to the passages before quoted.* The cases there stated shew, how quickly an infectious quality is communicated to the air from the variolous poison, and consequently they prove that the miasms adhering to clothes, if any do adhere, would be instantaneously dissolved in the air and become perfectly harmless.

Let us now consider the main question: in what circumstances, are the *Rules of prevention* defective? You conclude, that if it ' were forbidden to ' make common use of any clothes, ' linen, &c. which had remained in the ' small-pox chamber till they had been ' hung some time in the open air; and ' also, that any attendant on a small- ' pox patient should not mix with un- ' infected persons, without first con-

* INQUIRY, p. 32 and 97.

tinuing

‘tinuing in the air some time proportionable to the length of his stay with the former, all would be enjoined which safety requires.’ Now the third *Rule* contains the very directions which you enjoin. ‘No persons, clothes, &c. nor any other thing, that is known or suspected to be bedaubed with matter or other infectious discharges of the patient, should go out of the house till they be washed; and till they have been sufficiently exposed to the fresh air.’ I apprehend that the clothes, &c. of attendants on a small pox patient will always be *suspected* to be bedaubed with infectious matter, and consequently an exposure of their clothes to the fresh air is required by the *Rules* on stronger reasons, than a suspicion of contamination by variolous miasms. If therefore you have stated every objection, as you seem to have done, in its full force, I think that you may answer the second query in the affirmative, with a safe conscience, even upon your own principles.

Besides these general arguments in favour of the theory, there is another which rests upon your personal testimony. On the *facts* ascertained in the INQUIRY, you think great stress may be laid. You have certain knowledge, that the theory *preceded*, and you have reason to be perfectly convinced that it suggested, the observations of all the facts. This consideration I trust, will have great influence to satisfy your own mind, that the theory is both true and important.

So long ago as the summer of 1777, you may remember, that I came full of this theory, a few days after it had been conceived, to our friendly conversation at Frodsham, where we used to enjoy frequent and delightful interviews, for five or six hours, in the discussion of some medical, philosophical, or literary subject. At that meeting, an intimate friend, and a less familiar acquaintance, neither of them professional

fional men, accidentally, as travellers, joined us, and interrupted our intended disquisition. On that account, you may recollect, I desired you to retire into a separate apartment, in order to obtain a free, full and deliberate discussion of this new notion, which appeared to me highly important. You, as was your duty, raised all possible objections to my favourite idea. I defended it with that earnestness which resulted from a clear, and, I may say, from a demonstrative conviction of its truth, and of the practical conclusions, that might be deduced, and, which I now maintain, have been deduced, from it.

A warm advocate of any opinion generally retains some prejudices in its favour. This circumstance may, in some degree, account for your strenuous and eloquent defence of the old doctrine, though you candidly confess that it is contradictory to the whole tenour

of facts that have fallen under your own observation.

I request your farther thoughts on this philosophical and practical question. Speak freely all your objections, and doubts, but as a judge, not as a disputant, and you will much oblige

Your cordially affectionate friend,

J. HAYGARTH.

3. EXTRACT of a LETTER from Dr.
AIKIN, dated November 26, 1789.

‘ The facts produced evidently shew the possibility of preventing, or extirpating any contagious disease; but, as to the small-pox, the rich all now inoculate, and who cares for the poor?’

‘ I never remember having reason to suspect that I had carried the infection in my clothes, though I have been convinced that others have done so.’

4. ANSWER

4. ANSWER to Dr. AIKIN.

‘ I assure you that a dozen years of observation and reflection have more and more convinced me, that variolous mis-
afms *never* adhere to clothes, so as to communicate infection. These illu-
sions, when accurately examined, always vanish, like the baseless fabrick of a vision. I challenge you, or any man, who dare to maintain the contrary doctrine, to produce your proofs.’

5. EXTRACT of a LETTER from Dr.
AIKIN.

‘ I cannot answer your challenge respecting the conveyance of the variolous effluvia in clothes. I only spoke from the indistinct impression of forgotten facts, and may like enough be mistaken. Only, do not you, on your part, think the circumstance disproved, if it is not clearly demonstrated,’

III. EXTRACT

III. EXTRACT of a LETTER from
WILLIAM IRVINE, M. D. Professor
of Chemistry at Glasgow, dated March
11, 1787.

‘ I am extremely obliged to you for your kind remembrance of me, after so long an absence. I still reflect, I assure you, with the highest pleasure, on the many improving, and extremely entertaining conversations we formerly enjoyed together at Edinburgh.

‘ I have perused with all possible attention, your INQUIRY *how to prevent the Small-Pox*, particularly the chemical and mathematical parts of it; and, according to your desire, shall give you my opinion very freely. Though it were unfavourable, I know I shall run no risk of disobliging you; as the discovery of truth, and the good of mankind are the sole objects you have in view. The facts upon which the doctrine

trine in your Essay rests, seem to me to be well established; the arguments convincing; and the conclusions fairly drawn. I confess, that the proposal to prevent the spreading of the natural small-pox, at first, appeared to me, to be fanciful. But, I became more reconciled to it, as I proceeded in reading your papers, and at last fully persuaded of its practicability. I am now perfectly satisfied that the progress of infection in the small-pox may be stopped, by carefully attending to the circumstances pointed out in your book. I own, however, that the reports published by the benevolent and publick spirited society in Chester have added much to the weight of your argument; and I hope their example will be followed by the institution of similar societies, in other parts of England; but this will require time; the undertaking is arduous, and great attention will be necessary to insure success.

‘ The

‘ The whole of your chemical reasoning is undoubtedly just.

‘ I have only to observe farther, that the calculations (p. 27.) which refer to the chance of two or three persons in a family escaping the infection, if they had been exposed to it, are demonstrably true, according to the doctrine of chances, and have no occasion for any name to support them.’

IV. *A LETTER from THOMAS PERCIVAL, M. D. F. R. S. and S. A. Lond. F. R. S. and R. M. S. Edinb. President of the Literary and Philosophical Society of Manchester; Member of the Royal Societies of Paris, Lyons, &c. &c. dated May 10, 1787.*

‘ MY DEAR FRIEND,

‘ I resume, with pleasure, the office of friendship which you have assigned me; and after a third very attentive perusal

perusal of your INQUIRY *how to prevent the Small-Pox*, I can, with the same truth as before, assure you of my perfect acquiescence in your general doctrines; and of my conviction that you have established, on the most satisfactory evidence, every essential proposition you advance. But in this light I do not regard the hypothesis, concerning the solubility of the various effluvium in air, though ingeniously conceived, and plausibly defended. To many it will appear to involve your subject in obscurity; and will be rejected by some of the most distinguished philosophers of the present period, who deny the analogy on which it is founded, and ascribe evaporation, not to chemical affinity, but to the action of solar or electric fire, and the expansive nature of the bodies subject to it. But this link, in your chain of reasoning, will become no less strong than those with which it is connected, by substituting the terms "*diffusible in air*"

air" for "*soluble in air*," in your third proposition; and accommodating to this change, the other parts of your work, which bear a reference to it. And thus, I trust, all objections will be obviated to the patriotic, judicious, and practicable scheme you have proposed.

‘ Your various well attested facts clearly evince, that the contagion of the small-pox is limited in its energy to a narrow compass, and that by dilution, it is quickly and easily rendered innoxious. This is consonant to the nature of every known poison, which must subsist in a definite quantity or degree of concentration, to be capable of producing any deleterious effect. And though we cannot precisely ascertain the lowest point of activity, under which infection is capable of communication, yet even in the plague, we are assured that it takes place, at no great distance from its source. In the very malignant

malignant contagion, from the gaol distemper, which occurred at the sessions, in the Old Bailey, held in May 1750, it is particularly noted that the Chief Justice, who sat on the Lord Mayor's right hand, escaped, whilst his lordship, with the rest of the bench on his left, was seized with the infection ; that the Middlesex jury, on the same side of the court, lost many, whilst the London jury, opposite to them, received no injury ; and that of the multitude present, but one or two, or at most a small number of those, on the side of the court to the Lord Mayor's right hand, were taken ill. This partial action of contagion is ascribed to the opening of a window, at the end of the court, most distant from the bench ; by which the poisonous miasms were directed to, and accumulated in that part of the hall, where the fatality so remarkably occurred : And I think we are equally warranted to conclude, that the air of the whole court must have

have been contaminated; and that a moderate degree of dilution sufficed to render the contagious particles harmless. I have called your recollection to the particulars of this interesting fact, as recorded by my late excellent friend Sir John Pringle, because I think they illustrate, in a very striking manner, the position which it is your object to establish. Nor is such evidence superseded by the more direct verisimilitudes you have adduced. For not to urge the propensity of the mind to search out, and to be governed, in its practical judgments, by remote as well as near analogies, they extend our views, in the present instance, from a special to a more general law of nature; and increase our knowledge of the relations of things, at the same time that they strengthen our conviction of the truth. I would therefore farther remind you of an observation, which you communicated to me some time ago, relative to the Typhus; and apply it to

the

the subject of your INQUIRY. "The season," you say, in a letter dated June 26, 1786, "has been uncommonly hot and dry. I never knew so many fatal fevers, among the citizens of higher rank, especially among the ladies, in Chester. This has spread an alarm greatly beyond the cause. The epidemick has attacked comparatively few, but a considerable proportion has died; and these people of consequence." Now though the season was equally hot and dry here, as at Chester, we experienced a considerable abatement of the Typhous fevers, during the time you mention. Indeed their prevalence in your neighbourhood could not, I presume, be imputed to the atmosphere; because they seem to have attacked, not the lower order of people, who are most exposed to it, as well as most numerous, but a small and separate class of citizens, much less subject to the influences of the weather, yet peculiarly liable, from their inti-

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mate

mate connection, to catch from each other any infectious disease. Of this class, too the females, whose intercourse is the greatest, appear to have suffered most from the prevalence of the fever.

‘ I shall now proceed to a further compliance with your request, by giving a faithful and explicit answer to the several queries you have proposed.

Answer to Query I.

‘ The injunction that no person, who has not had the small-pox, shall be suffered to come into the infectious house, is wise and expedient as a general rule, but must sometimes be dispensed with, and is not absolutely necessary. The truth of this remark I can confirm by a case in my own family. And the detail of it will evince my thorough conviction of your doctrines concerning infection. Indeed having never experienced, in a long and

and extensive course of practice, the communication of any contagion among my children, my solicitudes on this point have gradually abated. It is my regular custom to receive and to prescribe for the poor, every afternoon, during the space of about two hours. They are admitted, by the back door, into a hall, eighteen feet in length, fifteen in breadth, and twenty-four in height, containing a large flight of stone stairs, near or under which they are usually seated. I am annually thus visited by more than two thousand patients, of whom a large proportion consists, either of children under the small-pox, or of those connected with them. For in a town like Manchester, which contains near fifty thousand inhabitants, this malady is always prevalent, and often most fatally epidemical. Through the hall which I have described, my youngest daughter, who is two years and a half old, has from early infancy, daily passed backward and forward with

her maid, during the hours of my giving advice, within the distance of three, four, or five feet from the poor. To the variolous miasms, in a diffused state, she has therefore been exposed, with impunity, a greater number of times than I shall attempt to estimate. Nor is her exemption from the natural small-pox, to be ascribed to an indisposition to receive it. For she was inoculated a few days ago, (particular circumstances not admitting of the operation sooner) and there is no doubt, from the appearance of the arms, that the infection has taken place.

‘ N. B. The inoculation succeeded, and the child had the small-pox in a mild and gentle manner, with more than a hundred pustules.

Answer to Query II.

‘ In the third rule of prevention, perhaps it might be advisable to give some

some explicit direction, concerning the feather bed, on which the small-pox patient has lain. This is seldom covered with a blanket, in the houses of the poor; and even when it is, from the restlessness of children, and the want of attention in those about them, the body must often be in contact with the bed. Now as the bed cannot be washed, and the feathers or flocks, with which it is filled, must be imbued by the perspiration, saliva, and even ichor of the ruptured pustules, some peculiar precautions relative to it, seem to be required. The same observation is applicable to the bolster and the pillows.

‘ It is recommended, in the same rule of prevention, that the foul linen, &c. should be immediately thrown into water, and kept therein till washed. But no direction is given that the water should be cold. If it be hot, the effluvia may infect with the small-pox, those incident to the disease,

Q 3

who

who inadvertently pass near it. I should prefer soap suds, or pot-ash, to simple water. Bathing the patient daily in comfortably warm water, after the maturation of the small-pox, is a most salutary practice, as I have repeatedly experienced. It obviates the secondary fever, cleanses the skin, alleviates irritation, and procures refreshing sleep. And by the adoption of this medicinal treatment, the patient will cease, much sooner, to be capable of communicating infection.

Answer to Query III.

‘ My recollection furnishes no instances to warrant an affirmative answer to this Query.

Answer to Query IV.

‘ To this query I can reply in the negative, as far as my personal observation extends. But I feel it incumbent on me to submit to your consideration the following

following fact, which I have received from indubitable authority. On due attention, I conceive it will not be found to militate against the doctrines you maintain. But however this may be, truth, I am assured, is held by you too sacred either to be misrepresented or concealed; and that, as a medical historian, you strictly govern yourself by the admired maxim of Cicero, *ne quid falsi dicere audeat; ne quid veri non audeat.*

‘ About two years since, Mrs. A. mother to the Rev. Mr. A. of Gorton, near Manchester, died of the small-pox, in the seventy-sixth year of her age. She was supposed to have caught the infection, by coming into the room soon after some persons had left it, who brought two children to receive private baptism. To afford you the more satisfactory information on this point, I shall subjoin the queries proposed to, and the answers received from Mr. A.

Q 4

‘ 1. Had

“ I, Had Mrs. A. been, at any time previous to her last illness, in a known situation of infection from the small-pox ?

Answer. “ I believe my mother was, “ at no time of her life, exposed to “ air infected with the small-pox, be- “ fore the time when she actually re- “ ceived the infection; all her children “ having been inoculated from home; “ and every other precaution used by “ herself and family, to prevent infec- “ tion. Till the age of sixty-five, at “ the place where she lived, the dis- “ order was little known but by re- “ port: and when it broke out in any “ one family, the alarm was so general, “ that it seldom spread much farther, “ unless communicated by inoculation, “ a circumstance which led many to “ oppose the introduction of that use- “ ful practice. I apprehend, therefore, “ that my mother, at the time she “ came into Lancashire, in 1774, was
“ as

“ as susceptible of the variolous infection, as at any former period. On account, however, of her being more frequently exposed to it, from the greater prevalence of the small-pox, we judged it necessary to exercise particular caution, whenever the disorder prevailed in this neighbourhood. And I think it was principally owing to this, that she so long happily escaped the contagion.”

‘ 2. Were the children, brought to be baptised, under the small-pox, or had they lately recovered from that disorder ?

Answer. “ The children baptised were twins, neither of whom was then ill, or had lately recovered from the small-pox. A sister of the mother of the children, from *another house*, who had lately buried a younger sister of the small-pox, and attended to assist the parents at the “ christening

“ christening, was the only person
“ who could bring the infection, from
“ which I believe my mother's last ill-
“ ness to have originated.”

‘ 3. Was the person, who brought
the infection, habited in the dress she
commonly wore, in her own house ?

Answer. “ The attendant was not
in her common dress.”

‘ 4. Did Mrs. A. enter the room,
whilst the people were in it ?

Answer. “ She did not; but came
“ into the room probably a *few minutes*
“ after they were gone, and I suppose
“ might *sit in the same chair*, which
“ the infected person had just left.”

‘ 5. How soon after the supposed
infection did Mrs. A. sicken of the
small-pox.

Answer. “ The christening was on
“ the 15th of February, 1785. On
“ the

“ the 24th my mother began to be ill ;
“ but we did not apprehend her dis-
“ order to be the small-pox till the
“ first of March, when it became evi-
“ dent to all but herself, from the
“ appearance of the eruption. This
“ she supposed to be only scorbutic ;
“ and we did not think proper to un-
“ deceiver her, whilst there remained
“ the least hope of her recovery. She
“ died on the ninth of March.”

‘ In this case there appear to me sufficient grounds to conclude, that the infection was communicated to Mrs. A. by some variolous matter, with which her chair had been contaminated, by the person who occupied it.

‘ How is the contagion of the influenza, of the measles, or of the catarrh of St. Kilda propagated, in which there subsists neither scab, serum, nor putrid effluvium ?

Answer

Answer to Query V.

‘ I have known numerous instances of the case you describe ; and never experienced the contrary, in a long and very extensive course of practice.

‘ Since the preceding pages were written, I have received, from the author, the present of a work, lately published at Lyons, which seems to afford a decisive answer to several of your queries. The title of it is, *Dissertations sur les Fievres infectieuses et contagieuses, par M. O-Ryan, D.M. de Montpellier, Professeur en Medecine agrégé au Collège de Lyon.* I shall transcribe the Section on *Variolous Miasms*, and leave it to your own comments. The book itself shall be sent to you by the first convenient opportunity, that you may judge of the authority of this detached part, by the execution of the whole. I have not the honour of knowing Dr. O-Ryan, but am informed he is a physician of eminence ;

nence ; and it appears that his dissertations were delivered to the members of the college at Lyons.

MIASME VARIOLIQUE.

‘ S'il ne résulte pas des dernières observations du savant docteur Paulet, ‘ que le contact soit absolument néces- ‘ faire à la propagation de la petite- ‘ vérole, nous devons, sans contredit, ‘ en conclure au moins que la sphère ‘ d'activité du miasme variolique est ‘ très-limité ; en effet plus on y re- ‘ gardera près, plus on sera convaincu ‘ que quelque dangereuse que puisse ‘ être cette maladie, on ne court aucun ‘ risque de la contracter, pourvu qu'on ‘ se tienne à une très-petite distance ‘ des personnes qui en sont atteintes, ‘ ou des choses qu'elles ont touchées.

‘ Dans la vue de jeter quelques lu- ‘ mieres sur cet objet intéressant, j'ai ‘ fait plusieurs expériences avec la ma- ‘ tierie

' tiere de la petite-vérole, & avec celle
 ' de la rougeole: toutes m'ont con-
 ' stamment fourni le résultat suivant,
 ' & le fourniront, j'ose le promettre,
 ' à quiconque voudra les répéter.

' Il se présentoit dans une maison
 ' que j'avois établi hors de cette ville,
 ' pour l'inoculation, des personnes qui
 ' faussement persuadées qu'une petite-
 ' vérole, produite par une bonne espece
 ' de cette maladie, doit lui ressembler
 ' à tous égards, amenoient avec elles
 ' leurs enfants, dans le dessein de la
 ' leur faire prendre par une communi-
 ' cation avec les inoculés.

' Après bien des efforts inutiles, pour
 ' les convaincre du contraire, voyant
 ' qu'on rejettoit les offres que je faisois
 ' d'inoculer ces enfants, ne doutant pas
 ' d'ailleurs que malgré mes raisons &
 ' mon expresse défense, on faisât tôt
 ' ou tard une occasion moins favorable
 ' peut-être, je leur fis subir la prépa-
 ' ration

‘ ration convenable, & les soumit aux
‘ expériences suivantes.

‘ J'imbibai de matiere variolique un
‘ gros paquet de coton, que je déposai
‘ au milieu d'une table ovale, dont le
‘ moindre diametre étoit de trois pieds;
‘ je rangeai ensuite autour six enfants,
‘ trois de chaque côté de la table, en
‘ sorte qu'il n'y avoit guere qu'un pied
‘ & demi de distance de chacun d'eux
‘ au coton infecté. Cette expérience
‘ se faisoit tantôt à l'air libre, tantôt
‘ dans la maison; j'avois soin de re-
‘ nouveler de deux en deux jours la
‘ matiere & la substance qui en étoit
‘ chargée: je me servis alternativement
‘ du venin pris des inoculés, & de
‘ ceux qui étoient attaqués de la petite-
‘ vérole naturelle; & j'en impregnois
‘ abondamment des pélotons de coton,
‘ de fil, de laine & de soie. Cette
‘ opération répétée pendant huit jours,
‘ le matin, à midi & le soir, à une
‘ heure par séance ne produisit pas le
‘ moindre effet.

‘ Je

' Je renvoyai alors les enfants, en
 ' recommandant aux parents de m'ap-
 ' peler au cas qu'une maladie quel-
 ' conque se déclarât, & de les ramener
 ' au bout de quinze jours, quand mê-
 ' me il n'y auroit aucune altération
 ' dans leur santé. J'atteste que non
 ' seulement jusqu'à l'expiration de ce
 ' terme, mais encore pendant plusieurs
 ' mois que j'eus soin de les visiter de
 ' temps en temps, ils jouirent tous
 ' d'une parfaite santé. Ce ne fut qu'en-
 ' viron neuf mois après que quatre
 ' d'entr'eux prirent une petite-vérole
 ' très-bénigne, dont ils guérirent.

' Ayant conclu de cette expérience,
 ' que les sujets n'avoient pu échapper à
 ' l'infection que parce qu'il manquoit à
 ' la matière variolique ce ressort & ce
 ' plus grand degré d'énergie qu'elle
 ' a, peut-être, au sortir immédiat du
 ' corps humain, je fis asseoir une per-
 ' sonne attaquée de la fièvre éruptive
 ' d'une petite-vérole, procurée par ino-
 ' culation.

culation. ... à la distance d'environ
un pied & demi du malade, je plaçai
quatre enfants préparés ; chaque ex-
position dura une heure, & fut ré-
pétée pendant quinze jours, à comp-
ter du début de la fièvre, jusqu'à
l'entière dessication des pustules : pas
un des quatre n'en reçut la plus lé-
gère atteinte. Deux mois après j'ino-
culai trois de ces enfants, & ils pri-
rent une petite-vérole d'une très-belle
espece, dont ils guériront sans diffi-
culté.

Des expériences semblables, faites
avec le sang & avec la matière glai-
reuse qui découle des yeux & du nez
des personnes attaquées de la rougeole,
ont toujours fourni le même résultat.'

' Towards the close of the year 1781,
I was honoured with a letter from the
president and committee of the college
of physicians at Edinburgh, relative to
the inoculation of the poor, in different
parts of England. It is probable that

R learned

learned body formed a design of patronizing this salutary practice, in the country under their medical jurisdiction: and I lament that a plan, so humane and patriotic, was not carried into execution. In my answer, I took the liberty of suggesting to the college, that the proposed inoculation might, without much additional expence, be extended to the measles, a disease eventually perhaps, no less fatal than the small-pox. Permit me to offer the like observation to you, on the present occasion; and to urge the propriety of including the measles in your projected institution. Such an enlargement of the object would exalt its importance in the public estimation; and might add so much weight to the scale of benefit, as to overbalance all difficulty and opposition.

‘ I have thus, my dear Sir, obeyed your injunctions; and have delivered my comments on your INQUIRY, with
the

the fidelity of friendship, and the zeal of one cordially interested in the success of your undertaking. Each repeated perusal of your work has heightened my value for it; and I rejoice in the conviction that it will prove a lasting and honourable memorial of the abilities and philanthropy of the author. But I am solicitous that every impediment to the favour and confidence of the public should be removed; and again take the liberty of recommending to you to withdraw, from the body of the treatise, all conjectural disquisition; and to rest your cause on the substantial evidence you have adduced from plain reasoning, well authenticated facts, and the uniform experience of the small-pox society at Chester. You have invented an ingenious hypothesis, and in some respects have made a legitimate use of it; for it has been an incitement to experiment, and a clue to observation. Yet I regard it only as the scaffolding, not as any part of the edifice

you are to erect. If I be mistaken in this point, I trust you will agree with me that your great appeal is to be made to the common sense of mankind; and that as an obscure doctrine of chemistry is not adapted to command general assent, the display and enforcement of it will be most proper in your concluding address to the medical and philosophical reader.

‘ It is an excellence of your scheme that the public good will be promoted by every stage and degree of its accomplishment. For some check to the progress of infection, and consequently to the ravages of the small-pox, will be its necessary result; and this check will bear a precise ratio to the extent and completeness of its execution. A general adoption and rigid observance of the plan, would produce an immediate extermination of this fatal malady. But the same happy event may be the gradual result of its more slow and imperfect

perfect operation. And your rules will promote a rational and successful treatment of the disorder whenever, or wherever it occurs.—But I forget myself, and am resuming my comments, when I ought to relieve you from the length of this letter. I shall, therefore, only add my fervent wish, that an institution, which promises security to individuals, a large saving of inhabitants to the state, and a still larger diminution of the general sum of anxiety, disease, and pain, may excite the attention of the legislature, the zeal of the medical faculty, and the approbation and concurrence of mankind.

With the most cordial esteem, I remain, dear Sir, your faithful and affectionate friend,

THOMAS PERCIVAL.

V. A LETTER from MARTIN WALL,
M. D. *Clinical Professor in the Uni-
versity of Oxford, dated August 28,
1787.*

SIR,

‘ The confidence, which you appear to place in my friendship, even more than the compliment, which you pay me by your application, incites me to seize the first leisure moment, which my engagements allow, to answer your obliging letter; but I fear it will not be in my power to add much to the evidence, which you have adduced.

‘ Since I had the pleasure of reading your *Inquiry* in M. S. my thoughts and my observation have been perpetually directed to the investigation of the modes, by which infectious disorders are most commonly propagated. I have not had many opportunities in the small-

small-pox ; but by a constant attention to some other contagious complaints, I am convinced, that, in all cases, contagion is conveyed but a very little way, by the air, from its source, and that the principal mode of its propagation is by clothes, &c. actually impregnated with the matter, not the vapour, of the contagion.

‘ If these premises be true, the following conclusion is indisputable ; that the spreading of contagious disorders, in general, may be prevented by certain regulations, and therefore ; that it will be productive of infinite benefit to mankind to inculcate and enforce the opinion that the small-pox may, by such regulations, be restrained in its devastations. If so, it becomes a duty of humanity and sound policy to encourage those institutions, which, like the Chester society, have this important object in view.

‘ Such is my opinion in general of the principles, upon which your plan is founded, and by which it is directed. I respect and regard both the penetrating genius which suggested it, and the patriotic exertions, which have been displayed in its support.

‘ In my former letter, in the year 1781, I mentioned some of the arguments which induced me at first to adopt this opinion. My ideas have been lately much extended and confirmed both by my own observation and by many excellent productions relative to this point, which have been published in various parts of Europe within the five or six last years.

‘ That the contagion of the plague is conveyed by the air but a very little way from its source; that the disease is principally disseminated by actual contact of persons labouring under the disorder or their clothes, &c. &c. and therefore

therefore that the best method of security against it, in preference to any plan of regimen, or the use of any specific, however extolled for prophylactic virtue, is to avoid the contact or even approach of infected persons or their clothes, was proved to a demonstration by the successful conduct of the committee of physicians at Moscow, who were appointed by the empress to attend those who were attacked by the plague.

“ Solo Ægrorum et rerum infectarum
 “ contactu communicabatur, atque at-
 “ mosphæra contagium non spargebat ;
 “ sed sanissima semper fuit. Visitando
 “ tam propè adstabamus illis ut sola
 “ pedis distantia inter nos et eos sæpe vix
 “ remaneret, et absque alia quacunque
 “ cautelâ, quam quod nec corpus neque
 “ vestes aut lectum tangeremus, a peste
 “ immunes permanserimus. Linguam
 “ proprius observando solebam linteum
 “ aceto communi imbutum naribus et
 “ ori admoveare.”*

* Mærtens Hist: Pestis Moscuensis, ann. 1771.

‘ These

‘ These remarks concerning the propagation of contagion in general being premised, I will relate to you some cases of small-pox which lately came under my care, as they may perhaps supply some farther illustration of this matter.

‘ I was desired on Sunday the twenty-second of July, to visit a boy in the suburbs of this town, who laboured under the confluent small-pox to a violent degree. It first appeared on the Tuesday preceding (the 17th). There were, in the same house with him, four other persons, who had never had the disorder, and they were under great apprehensions about it. After giving some directions for the boy, I ordered all the rest to be immediately inoculated with fresh matter from him, and prescribed some alterative powders similar to those of Baron Dimsdale, with a proper regimen. On the second day from the operation, the arm inflamed in

in all the four, and the inflammation went on regularly: they all sickened on the Saturday (the 28th) or Sunday (the 29th), and the eruption appeared in all on Monday (the 30th) or Tuesday (the 31st). In the adult and two of the children, the disorder was very mild; in one of the children, a girl about twelve years old, it proved more violent, and approached to the confluent form. But all the family recovered without any particular distressing symptom. These cases shew, in the first place, either, that the infection by inoculation takes place sooner and even prevents the effect of the contagion in the natural way, if it be supposed that the same persons, who were here inoculated, had previously taken the natural infection; or, if it be supposed that they had not taken the natural infection previously to the inoculation, we have a convincing proof, that persons, who have never had the small-pox, may continue even in the same house with persons

labouring

labouring under it, without taking it, especially if they be prevented from coming near the patient. The woman above-mentioned was the principal manager of the family, went often into the young man's chamber, and at times came very near him: but the children, I believe, never did.

‘ It is a general remark, that the infection by inoculation takes place sooner than in the natural way. Your own observations shew, that in the latter case the eruption generally appears between the eighth and the sixteenth day from the infection: and under inoculation it generally takes place a few days sooner, commonly from the sixth to the fourteenth. There is however no possibility of arriving at certainty in this comparative view, especially with regard to the natural small-pox, as we cannot there possibly determine with precision the time of infection. In many cases, where the disorder

disorder appears very long after the supposed period of infection, it is probable the infection did not take place according to that supposition, but at a much later period. And if this be true, it follows, that persons who have never had the disorder, are frequently in company with those who labour under it, and even within the circumstances commonly supposed sufficient for infection, without taking it. The fact is, their escape is to be ascribed to their not having really breathed the contagious atmosphere, or to their not having touched the diseased person, nor his clothes, nor any of the exuviae which may have been lodged in them. If these positions be true, they certainly furnish a strong argument in favour of your plan, and of the method by which you have proposed to prevent the spreading of the small-pox.

‘ I will now, agreeably to your request, pay attention to each of your queries

queries separately, that you may not want any assistance or support which my poor opinion can give to a design so benevolent and humane.

‘ I. It does not appear to me, that the rules of prevention contain any unnecessary restriction: they do not infringe more upon personal liberty, than is absolutely necessary for the general welfare and security; and they are not accompanied with that apparatus of terror which has been sometimes adopted in similar circumstances. We have instances of this excessive severity in the regulation of the quarantine in some countries; and in the laws for preventing the small-pox in Rhode Island, as described by your friend, Dr. Waterhouse.

‘ II. My experience will not authorize me to say decidedly, that the rules of prevention comprehend every necessary restriction, but from your own state

state of facts, I think it cannot be disputed, that your rules are perfectly adequate to the purpose, wherever they can be fully enforced either by rewards, by example, or by authority: of these, the two former are not less powerful, and generally in this country more successful, motives, than the last; and therefore a liberal subscription should be encouraged for the supply of the proper *præmia* to those in the lower class of life, who minutely and rigidly adhere to the rules of prevention. Those in more affluent circumstances should be prevailed upon by argument to adopt and pursue the same plan, not only for their own advantage, but for the sake of example to their more poor and ignorant neighbours. When inoculation was first introduced into this kingdom, even the highest order of the church thought itself not discredited by recommending and enforcing from the pulpit this salutary practice, and explaining the advantages of its intro-

duction

duction in a moral, religious, and patriotic, as well as in a medical view. How far the hand of authority may be permitted hereafter to interpose, must be determined by the success of the plan under private direction. If it should be found, as I am convinced it will, both easily practicable and highly beneficial to the community, the legislature will do well to support and extend these benefits by the gentle exertion of the authority entrusted to it, so that what is now performed in your scheme from motives of private advantage may then become a public duty and obligation. The restrictions required (and they will be only temporary) must then be considered as a part of that sacrifice of individual liberty, which, under every form of government, is, by tacit compact, resigned into the hands of the magistrate for the more perfect accommodation and safety of the state.

• III. I cannot

‘ III. I cannot say, that I ever knew three or more persons, who escaped the small-pox, after being exposed, in the manner you mention, to the infection.

‘ IV. and V. Much has been said concerning the communication of the small-pox solely by the smell of the clothes, &c. of persons going from one house to another, in the manner mentioned by you. I have heard (and who has not?) of people who have taken the disorder from the wig of a physician or apothecary, who had visited a small-pox patient not long before. And it must be so, it is alledged, because he was particularly careful to change every other part of his dress. But we all know how extremely fallacious such accounts are. How comes it to pass that apothecaries, inoculators, nurses, &c. are continually going from house to house, while they are attending small-pox patients, without any care, and in ninety-nine cases out of a hundred,

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without

without communicating the disorder to those who have not had it? They visit, for several days, their patients under preparation for inoculation, and yet an instance has hardly been recorded of one patient taking the disorder previously to inoculation.

‘ We have often heard of persons (in whose minds the idea of the small-pox has been constantly associated with terror and apprehension) being taken with the symptoms of the eruptive fever, *immediately after* seeing a patient under the complaint, in the street, through the window of a carriage, or of a house, without the possibility of tracing any other way, by which the infection could be conveyed. I have heard many instances of this kind related by different people; but I cannot say that any one ever came under my own observation; nor did I ever hear one from a person whom I thought sufficiently conversant in medicine, to deserve

deserve implicit confidence. People, who are not aware how frequently such relations have their foundation solely in imagination, hear and remember these things only as being miraculous, and are not desirous of investigating any mode, by which the mystery may be unravelled. There are so many circumstances which might deceive the mind of a common observer, that it requires much better authority than I have ever had, or probably shall ever have, to induce me to adopt the opinion, that the small-pox or any other contagious disorder can be propagated by fear alone.

M. WALL.'

END OF VOLUME THE FIRST.

